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ORIGINAL ARTICLES.

FUNCTIONAL SPINAL PARALYSIS.

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CHICAGO, ILL.

Notwithstanding the progress that has been made within the last decade regarding the physiology and anatomy of the spinal cord, as well as the pathology and the pathologic anatomy belonging to the diseases of this organ, much obscurity remains. Many of the diseases of the spinal cord are not rapidly fatal, so that an opportunity for post-mortem examination can not be had at a period when the symptoms would suggest most strongly the desirability of such an examination. An autopsy in many cases is only available after the symptoms have advanced to such a degree owing to the extensive organic changes which have taken place, that examination of the cord at this period is of very little value in discovering the minute pathologic changes which may have given rise to the earlier symptoms. Nothing remains, however, at present but for clinicians to go on carefully reporting irregular and anomalous cases in the hope that the data thus afforded may finally in some way help to elucidate the pathology. It is in accordance with this purpose that the following case is reported:

Case 1.—F. O., Norwegian, aged 35, stone cutter, married, was admitted to the Cook County Hospital June 29, 1893. Nothing important in the personal or family history except that he had syphilis fourteen years ago. Habits regular, and he had always enjoyed good health prior to the present illness, which began about two years previous to admission while working at his trade. He worked in all kinds of weather and not infrequently in wet clothing. The first symptoms consisted of a numbness in the fingers and toes which gradually extended upward toward the elbows and knees respectively. There was also at the same time gradually increasing weakness and ataxia which had become so great eighteen months after the onset as to seriously interfere with his work. He could not hold or handle his tools as before, and would sometimes unexpectedly and involuntarily drop them, owing in part to lowered sensation and in part to muscular weakness, and his gait became awkward and uncertain. He knows that sensibility to touch was considerably impaired, but he does not feel so positive regarding the sensibility to pain. He had no trouble at any time with the functions of the eyes, bladder or bowels. About one month before admission he had to give up work entirely and was only able to walk with assistance. From this time forward he grew quite rapidly worse until one month after admission, when he was wholly unable to support himself on his legs and continued so for about six weeks. Examination upon admission revealed impaired sensibility to touch, and pin pricks, especially from the knees downward and less so from the elbows downward, progressively more marked as the distal extremities were approached, but normal elsewhere. The knee jerks were entirely absent, abdominal and cremasteric reflexes were normal, but the condition of the plantar reflex is not noted. Vision and the pupillary reflexes entirely normal. While in the hospital the patient was well nourished, ate and slept well, and was in fact in good general health. Though the appearance of his legs and arms would not indicate actual atrophy they were rather small, considering the occupation of the patient, and he volunteered the statement that his arms particularly had gradually grown smaller during the last few months in which he had continued to work. As already stated, after he had been in the hospital about ten weeks, the latter six of which he was unable to walk, under the treatment of potassium iodid in full doses strychnia, iron and faradism he began to improve both in regard to motion and sensation and left the hospital fourteen weeks after admission to it, well enough to accept employment in a boiler factory four weeks after his discharge, and three months later all his symptoms had entirely disappeared except that his knee jerks had not returned.

As to his condition at this time his own statement has to be taken. He is an intelligent man and says that he frequently repeated the tests he had often submitted to while in the hospital. Indeed, so complete was his recovery at this time that his work requiring him to swing a thirteen-pound sledge was easily performed, and he could run down a street car, for instance, as readily as ever. A few weeks later he obtained employment at his trade at which he worked steadily and remained entirely well for about six months, when two weeks prior to his present admission, Aug. 20, 1894, the former symptoms somewhat suddenly returned and developed within a few hours to such an extent that he was unable to go on with his work. It should have been stated before that in this attack, and after the symptoms in the previous attack were pretty well developed there was a sense of considerable stiffness in the calves of the legs. In this latter attack, neither the subjective nor objective disturbance was so marked as in the first attack. In one month after the onset he was again entirely unable to walk and in essentially the same condition as before. His inability to walk on this occasion was of three months' duration when he began gradually to gain sufficient power for this purpose, and while the sensory symptoms have improved, if anything more rapidly than before, the improvement in the motor symptoms has been much less rapid. The treatment has been practically the same.

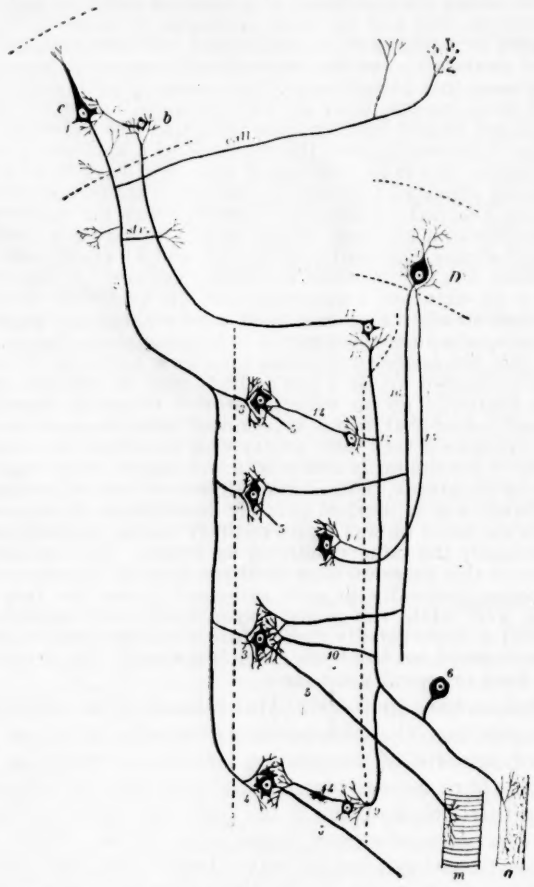
Somewhere in the hospital records it is noted that the gait has the characteristic ataxia of tabes, and the diagnosis of locomotor ataxia is recorded, but while there were evidently distinct signs of ataxy, it may fairly be doubted if the gait was very similar to that so often observed in genuine tabes. Since the patient has been under my observation, though the gait has been quite unsteady and he has been obliged to walk with a cane, I have not thought it strongly suggestive of tabes. It should be added that he can not stand alone with his feet together and his eyes closed, and though the fact is not, I believe, stated in the history sheets, it is very probable that the condition existed when he was first admitted.

The accompanying diagram, prepared by Professor Schaefer, of London, accurately represents the present state of our knowledge regarding the physiologic anatomy of the spinal cord and brain as regards the functions of motion and sensation.

Considering this case in reference to this diagram, in connection with some of the best established facts in the pathology of the nervous system, I beg to make the following suggestions. The symptoms could be accounted for by assuming a functional inactivity of the peripheral nerves supplying the muscles and integument of the extremities. It should be remembered that these are mixed nerves

containing both motor and sensory filaments. It should further be remembered, that the process could not be regarded as being confined to the extremities of one or two particular nerve trunks, but to the peripheral endings of all the several nerve trunks supplying the skin and muscles of the hands and feet.

Recent researches have demonstrated that the main function of the nerve cell is nutrition, and it is therefore reasonable to infer that if the function of the nerve cells (3 and 6) be impaired that the nutrition of their respective fibrous processes (5 and 7) would suffer, and furthermore, that the parts of these processes first to suffer would be the parts most remote from the cell bodies. This hypothesis would



a, skin on the surface of the body; *17*, a sensory cell in the medulla oblongata; *b*, sensory cell in the cortex of the brain; *c*, motor cell in the cortex of the brain; *D*, cell in the cerebellum where muscular movements are co-ordinated; *3*, motor cell in the spinal cord; *m*, muscle The course of a stimulus at "*a*" can readily be followed to the cortex of the brain and back again to the muscle, resulting in a muscular movement.

explain why the disturbance of motion and sensation should begin in the fingers and toes and gradually extend upward. It would also explain why the knee jerks were lost, because the lesion would involve the reflex arc. (*a*, *7*, *8*, *10*, *3*, *5*, *m*.)

The character of the early motor and sensory symptoms together with their mode of onset, excepting their chronicity, is very similar to that usually observed in cases described as ascending paralysis or ascending myelitis, but the absence of all constitutional symptoms, of disturbance of the functions of the bowels and bladder, together with the fact that complete and somewhat prolonged recovery ensued, make it apparent that the process did not advance to actual inflammation.

As the patient is an intelligent man, one other statement might be made which to some extent supports the view that the function of the cell in the anterior horn of the cord was at least impaired, and that is, without being interrogated upon the point he volunteered the assertion that his legs and arms shrunk considerably. In fact, if the shrinking noted by the patient were a slight degree of genuine atrophy it would be another evidence of the functional impairment of the cells in the anterior horn.

So far as the patient could judge, his recovery was complete, as he himself frequently applied all the tests to which he had been subjected while in the hospital, and could discover no impairment of motion or sensation, and he was even able to stand perfectly well with his feet together and his eyes closed, but he could never succeed in developing a knee jerk. Hence it would have to be assumed, unless he were one of those individuals naturally without a knee jerk, the full and complete functions had not been restored.

Hitherto, when functional disease has been invoked to explain disturbance of motion and sensation, the process has usually been assumed to have its seat in the cortical cells of the cerebrum, and there seems no good reason to doubt that such an assumption is generally correct, but at the same time there appears to me to be no good reason to suppose that functional disturbance might not be confined to the cells in the spinal cord.

In this case a functional disease might be assumed to exist, confined to the cells of the cerebral cortex, which would account for all the symptoms excepting the loss of knee jerks which ought to be increased, or at least present in cortical disease, inasmuch as the inhibitory influence which the upper motor segment (*a*) in the diagram normally exercises over the lower motor segment (*3*) would be impaired, and furthermore, hysterical (cortical) quadriplegia with such an onset and with such sensory symptoms as the patient presented has not been described, so far as I can recollect. I wish to repeat, therefore, that to my mind the type, course and distribution of the symptoms vastly favor the hypothesis that the lesion was spinal.

It might be added that the absence of lightning pains, the rapidly progressive weakness and the complete recovery tell conclusively against a diagnosis of locomotor ataxy; while if myelitis had been assumed to exist and had advanced far enough to have given rise to such severe and persistent paralysis as happened in this case, some more marked indication of permanent injury to the elements of the cord and disturbance of the function of micturition together with increase of the knee jerks might be expected. Neuritis advancing to so high a degree of paralysis would have been accompanied by severe pain, tenderness of the nerve trunks and marked atrophy.

That the functional disturbance above described may indicate the approach of an organic process would seem to my mind not at all improbable.

DISCUSSION.

DR. HAROLD N. MOYER—The case as presented by Dr. Brown and his deductions from it are very instructive. If we stop for a moment to consider the pathology of the nervous system we are at once met with three periods. The first includes purely clinical demarkations with the terms locomotor ataxia, spastic spinal paralysis, etc. We then come to the period of pathologic anatomy, and it was but natural the pendu-

lum should swing rapidly in the other direction, and that the term, locomotor ataxia, should yield to the term, posterior spinal sclerosis, and the term, infantile paralysis to poliomyelitis anterior acuta, and other terms distinctive of definite and fixed pathologic changes. That period, I think, has already passed, and we are confronted to-day with certain questions which negative somewhat the strict anatomic distribution of nerve lesions as, for instance, we no longer regard locomotor ataxia or tabes as a pure sclerosis of the posterior columns of the cord, but we class it under the general diseases of the nervous system; and so with many other affections. The reason of this is perfectly apparent. The first and most palpable lesion associated with a given set of symptoms was supposed to be by a direct and positive accounting for that set of symptoms, and he did not take into account the secondary conditions, that may have been produced by the later stages of an exhausting malady; in other words, a mixed change due to marasmus and other depressing conditions which come on late in the development of certain maladies. The pathologic anatomy of paralysis agitans is nothing more than a description of the pathology of the aged or those who die of exhausting diseases. Dr. Brown's paper is to my mind one step in advance along this general line. With regard to the differentiation which he attempts to make between functional and organic paralysis, I will try to point out what I conceive to be an error in his paper. He says that because the paralysis disappears and again returns, is to him evidence of functional derangement. While that may be according to the definition which the Doctor would attach to the term, functional, we know a vast number of organic lesions which pursue this course—paretic dementia, locomotor ataxia, and many other lesions which are associated with demonstrable and early pathologic changes in the nerve cells and nerve fibers, associated with such remissions as were noted in his case. I think also the Doctor's inability to distinguish between the possibility of a peripheral lesion and one involving the spinal cord is a point well taken, and one often lost sight of in the pathology of spinal lesions. I am confident that there is no means of absolutely distinguishing between peripheral nerve lesions and those which involve the anterior horns. I would differ, however, from the Doctor in regard to this being a purely functional lesion, but would not have too much importance attached to that difference, because this term, functional, and the term organic, are used altogether too loosely. I think there is a difference in the mind of almost every observer. One gives a certain definition and weight to the term, functional, and another a somewhat different one, and until the term is more definitely employed I certainly would not attach much importance to it.

I think the case is an exceedingly interesting one, and one that has been carefully observed.

Dr. James G. Kiernan—As to this question of functional and organic conditions, I agree with both Drs. Brown and Moyer in the main, since I do not think there is such a wide difference as might at first be assumed. What is beginning to be true of general neurology was true of psychiatry. At one period lesions were found to explain every form of insanity; at another period there were no lesions at all, and at still another there were doubtful lesions. In dealing, for example, with cerebral conditions which would correspond with the so-called functional spinal conditions mania, melancholia, etc., it is practically settled now that in about 15 per cent. of the cases changes only are present, which are secondary to those which went on in the primary stage. The way to avoid controversy regarding functional and organic, which terms run all through pathology, is to introduce the term and recognize the condition which is present. This change or condition may be designated bio-chemical. Applying same analogy with regard to the psychoses to the neuroses, which are not very well defined pathologically, conclusions may be made backward from secondary conditions to what bio-chemic change must have happened in leading up to them. More than twenty years ago, Charcot described a case in which hysterical paralyses, implying a spinal element, had so long continued that they had been followed by direct spinal lesions which were secondary to disuse and not primary, as was evident on autopsy being made and revealing certain conditions. Dr. Brown's paper raises the question whether in a large number of these spinal conditions (I will admit this position is taken largely by railway surgeons) there is not a temporary bio-chemic condition which simulates, for the time being, almost all organic conditions. I am strongly of this opinion. For instance, a spinal condition may occur in neurasthenics. So-called spinal neurasthenia may simulate locomotor ataxia completely. When I say completely, I mean even the lightning-like pains, which in fact here are not true lightning-like pains, but topoalgia. When these conditions are continued long enough, in the place of a bio-chemic condition we have a condition of excitation of the local conditions which results in periodic organic change.

With regard to the case under discussion, a somewhat similar one was described about three years ago by Salemi Pace, under the peculiar title of "spinal amnesia." He intended to convey the idea by that term that some of the spinal centers temporarily, as it were, had forgotten their function under certain conditions of shock function, which was gradually regained, the manifestations, however, meanwhile simulating various well marked myelitic conditions and sclerosis of the posterior horns. If the claims made by the railway surgeon could be accepted this condition would be ideally represented. Over-exaggerated as these claims are, since the neurasthenic element is made to simulate everything from locomotor ataxia to myelitis, there are conditions where it may do that. I have been very incredulous as to these conditions, yet a year ago in consultation with Dr. Haskell, of Alton, I saw a case in which every one of the symptoms of locomotor ataxia were present, exclusive of the eye conditions. There was hyperemia of the optic disc, but no other change evident in ophthalmologic examination. There were bladder and rectal symptoms; the bladder symptoms were clearly of psychic origin. Up to this time the urine had to be drawn with a catheter for two weeks. I was satisfied it was one of those rare conditions of traumatic neurasthenia; the patient having developed all these symptoms subsequent to an injury which he had received from his own machinery. He was unable to pass urine without catheterization for two weeks. I was sure there was a psychic element in the case. The night after I saw him the catheter was unnecessary and the man went steadily on toward recovery. The knee jerks were absent, but subsequently reappeared.

In another case which was sent me by Dr. Ribert, of Omaha, the diagnosis of locomotor ataxia was positively made. The man had a gait similar to an ataxic, except it differed in that after he started to walk, and was observed closely, the gait got worse; whereas the ataxic gait, after the man gets started, gets better; in other words, the ataxic makes his cortex do the work, to a certain extent, of the spinal cord. This case had trouble of accommodation, and had hyperemia of the optic disc which had been diagnosed as optic atrophy. He had topoalgic pains which closely resembled the lightning-like pains of locomotor ataxia. That man entirely recovered under the Weir-Mitchell treatment, and static electricity.

A large number of temporary spinal disturbances, occur in lues, diabetes, diphtheria, etc. I am inclined to believe that in almost all the infectious diseases when the knee jerks

disappear conditions which closely simulate organic diseases occur but recover. These cases indicate that in the spinal cord a bio-chemic condition may occur which is not permanent, therefore is not organic, which closely mimics, nay, which precedes all these organic conditions, but which may recover under appropriate treatment. This would explain one of the phenomena everybody has noticed, the cure of "locomotor ataxia" by the quack, the religionists and the faith cures.

DR. JAMES A. LYDSTON—A few points suggested themselves as the paper was read. In the first place it seems with respect to the diagnostic manifestations in the case referred to, that we are too prone to come to a positively definite conclusion in our diagnoses, for the reason that we only have symptomatic phenomena to guide us. It is all very well for us to talk about diagnoses after our patient is dead and the necropsy table shows us various pathologic changes to guide us; but we are delving somewhat in unknown realms, particularly with respect to the cases referred to in the paper this evening, for we know with reference to the diagnostic manifestations of spinal lesions that we do not always have positive unmistakable symptoms to guide us. Particularly is this true with respect to tabes dorsalis, in which we know that in the majority of instances in the early stage there are no diagnostic symptoms to guide the neurologist in coming to a definite conclusion. And it is here that we find the ophthalmologist comes most actively into demand, for in a certain percentage of instances in which tabes dorsalis and various other spinal phenomena are at issue, the ophthalmoscope is the only means at our command of determining positively the diseased condition. It is particularly true with respect to these spinal lesions, and as I said at the outset of my remarks, it is only by careful examination on post-mortem that we find gross or microscopic pathologic changes to account for the various symptomatic phenomena that have caused the patient to consult us with reference to his condition. I have in mind at this moment, a gentlemen, a prominent business man in the city of Chicago, who to-day is suffering with tabes dorsalis and does not know it, nor does he deem it necessary to consult a neurologist with respect to his condition. It seems to me, that in view of these anatomic and pathologic considerations we must consider that, however apparent the disease is of a functional nature, it may be accounted for by circulatory and nutritional changes, and that these changes are caused by some focus or minute foci of disease at some point or points in the spinal cord. These remarks are substantiated by microscopic examinations, anatomic investigations and by physiologic occurrences. Another point that I wish to call attention to is the fact that the knee jerk is not always an absolute test in these cases; as the individual who is suffering with spinal disturbance may in some cases have no disturbance of the knee jerk that can possibly and unequivocally be defined. So that I would say, in conclusion, that cases of apparent functional spinal paralyses are evidences, no doubt, of some pathologic change at some point either focally, or diffusely distributed throughout the cord or the cortical substance.

DR. H. M. BANNISTER—I can add very little to this subject except to confirm what Dr. Kiernan has said by giving my own experience not quite so striking as his, but still in the same general direction. A case occurred in my observation in which there was typical locomotor ataxia, no symptom lacking so far as known at the time, yet it had not been recognized by the patient or his physician. The diagnosis was agreed upon, and although at that time the specific nature of tabes was not generally believed in, I suggested and advised the use of specific treatment. The man improved and died eight years after; I do not know exactly what his condition was during that time, but I think he died of a complication of spinal disease.

The other case I will refer to bears closely on Dr. Kiernan's case. The patient was one of a neurotic family; one relative committed suicide, another was subject to various nervous troubles, two sisters were arthritic in the last degree, and he himself was subject to attacks of epileptiform migraine sometimes simulating true epilepsy. In connection with his attacks, occasionally he would have symptoms of spinal disease strongly marked—the girdle sensation, exaggerated knee jerk, disturbance of the bladder, etc. I do not recall all the symptoms at this time, but they were very suggestive of myelitis. They all soon passed away and left him well for weeks or months at a time. In connection with these attacks, one peculiarity of the case was that the knee jerk and deep reflexes were expressly exaggerated and the testing of them was a serious matter to him. It threw him entirely off his balance. All these symptoms were temporary, lasting from a few days to a week or two, and recurring at irregular intervals of weeks and months. The case was one which I considered was largely neurasthenic, complicated, however, with more serious nervous troubles closely approaching attacks of epilepsy.

DR. BROWN (closing the discussion)—The term functional disease has a somewhat loose significance. I employ it to designate a disturbance of the function of an organ when by our present methods of investigation no definite pathologic change could be demonstrated in that organ. For the reason stated, it is pretty evident that in this the disease is spinal, and it is hardly conceivable that inflammation could have advanced far enough to produce the symptoms described and then disappear so as to permit a prolonged and almost complete resumption of the natural functions. That the functional disturbance of the cord from which this patient has suffered may, so to speak, herald the approach of permanent organic changes seems to me not improbable, and if so it ought logically to be considered as the beginning of organic disease, while at the same time it is functional within the meaning of the term as above defined. Strictly speaking, the existance of functional disease may be doubted, but nevertheless if used as defined above it is a very convenient term.

THE ETIOLOGY AND TREATMENT OF INTERNAL STRABISMUS.

Read before the Section on Ophthalmology of the College of Physicians, Philadelphia, Oct. 16, 1891.

BY HOWARD F. HANSELL, A.M., M.D.
PHILADELPHIA.

I can not hope to discuss this extensive subject exhaustively, and I shall, therefore, limit my remarks to a brief consideration of functional internal strabismus arising from the unconscious constant contraction of the ciliary muscle in its effort to sharpen the blurred retinal image of the hypermetropic eye. No theme in ophthalmology has received more attention. A perusal of the literature of the last few years impresses the reader with the unanimity of authors as to their belief of the origin of squint and its proper treatment; yet shows great diversity of opinion 1, as to the part played by amblyopia, whether a cause or effect; 2, the result on vision of tenotomy, and he can not fail to remark that no important or decisive progress has been made since Donders' time, nor are we nearer a solution of the vexed questions than he was. It is worthy of note that thirty years have passed away and our knowledge of the true nature of internal squint has not been materially increased. No such stagnation marks the history of

other branches of ophthalmology. We boast of our progress and justly, for has not the ophthalmoscope revolutionized the study of intra ocular, intra-cranial and constitutional diseases, and cocain and antiseptics the surgery of the eye? But hypermetropic squint, notwithstanding conscious failures in its cure, remains where Donders left it. His great discovery is accepted by the ophthalmic world. The most eminent authorities believe that hypermetropia causes squint. The exceptions are a very small minority. For my part do not question it nor, I believe, does any ophthalmologist within sound of my voice.

Does amblyopia precede or follow the appearance of squint? Is it the cause of the inward deviation or the result of the non-use of the eye? Strabismic weakness of vision or amblyopia is thus defined by Alfred Graefe: "During the existence of a strabismus or after spontaneous or artificial cure, the vision of one eye is diminished below that of the other, and close examination will reveal no cause or one entirely inconsistent with the grade of the vision." He ranges himself in opposition to those who say it depends upon the non-use of the eye or upon the uninterrupted dragging of the retina or nerve by the abnormal convergence, and agrees with Knapp that the unequal action of the external muscles does not develop astigmatism of the cornea and thus produce lessened vision. The arguments he uses are familiar and need not be repeated. He believes that amblyopia is congenital and of central origin, and that hypermetropia is the prime cause of squint, which is maintained by a shortening of the muscle; that but little improvement of vision can be expected after tenotomy. In those cases of amblyopia without squint, he has been able to determine an early squint, which spontaneously disappeared.

Stilling's plausible theory of the position of rest as the cause of strabismus does not seem to have gained adherents. It is scarcely tenable. It is true that, as he says, the bounds of relative accommodation have been overstepped in strabismus, and binocular fixation is no longer a factor in controlling the position of the eyes, but this condition is induced by some antecedent power in active operation, such as hypermetropia, or by some anatomic peculiarity. The squinting position is, no doubt, a subjectively comfortable and restful one, since it enables one of a pair of misshapen eyes to assume the position in the orbit made necessary by the functional, and later anatomic shortening of the muscle. The factors he quotes as corroborating his view—the axis of the orbit, the position of the entrance of the optic nerve and the topographical relation of the fibrous and soft parts—have been used as arguments by those who believe the position of rest is divergence. The homonymous images discovered by experiments made with his own and friends' eyes by momentarily opening and closing the lids while gazing at a star, or light, or by artificial diplopia by Graefe's test, indicate simply the presence of a common muscular anomaly—esophoria, and can not properly be compared with results obtained by examination of a similar number of subjects while asleep or under anesthesia. Before cocain was used in ophthalmology, it was no unusual occurrence to observe, during anesthesia for tenotomy, that the squint had entirely disappeared when monocular, or had been transferred to the other eye. Schneller, in opposing the origin of squint out of "elastic superiority," and his expressions apply as well in disproving Stilling's theory says: "I remembered that strabismus either disappears or becomes materially lessened in the condition of rest. Yet more marked is this, in deep narcosis, when every active movement ceases. Every convergent squint is lessened; in some entirely ceases, in a few goes over into divergence. It is impossible to determine the effect of operation under narcosis. Not only does convergent and divergent squint diminish or disappear in many cases, but is never, so far as I know, increased. The same happens in the dead. Weiss reports a case where the convergent squint materially lessened in the dead. Also, I remember having seen, during life, a squint which was gone after death." Gardner, of Chicago, in a short paper in *The Archives*, in answer to Stilling's paper, says that squint which is found with amblyopia acquisita is usually the divergent form, arising in conformity with Nature's law that predicates that when an organ is not used, its function is gradually lost. "If one eye has become blind from one cause or another, the struggle for binocular vision ceases. When the good eye is directed to an object where convergence is necessary, the blind eye simultaneously converges by force of habit and in obedience to identical nerve stimulation, but as the object is not seen, convergence of this eye becomes unnecessary, and gradually it becomes unsteady, then lags behind and passes into a relative divergent strabismus which may or may not become absolute. The exceptions to this rule are those cases which have enough hypermetropia to induce pathologic convergence, when the amblyopic eye assumes the convergence. These are cases of amblyopia congenita and not acquisita." He denies Stilling's assumption that when one eye has turned in, the relation of accommodation and convergence is abolished. On the other hand, the normal exercise of the accommodation in the straight eye is possible only because the squinting eye assumes the convergence of both. Again, it is shown by numerous reliable writers, that it is possible to bring about amelioration or cure of the squint by resumption of the function of both eyes through the continued use of atropin and properly fitted glasses. Now, if convergence were the position of rest, all inducement to recover binocular vision would be wanting and a cure would be in opposition to Nature's law. Moreover, if abnormal convergence were the position of rest of hypermetropia we would find, not only convergent squint in hypermetropia but that it would be more common in hypermetropia than it really is.

The coördination of the visual axes, or the want of it, depends upon several conditions, namely, the refraction, the vision, the relative strengths of the several external muscles, the axes of the orbits and the innervation, including the conductibility of the nerves, the functional activity of their nuclei and of the cortex. Since our study deals only with purely functional deviations, we need consider only the bearing of the refraction, the vision and the innervation:

1. The Vision.—Congenital amblyopia, without anatomic changes in the media or fundus that can be detected by the ophthalmoscope or any other means, is associated with internal squint in about 75 per cent. of all cases. Vialet (Arch. d'Oph. Vol. xx, p. 289) analyzed 150 cases of strabismus, and found 122 with amblyopia. He says that in eight of fifty-one repeatedly examined cases, improvement of vision

began after tenotomy, and mainly in convergent strabismus with amblyopia of brief existence and low degree. We can only speculate concerning the relation of amblyopia to squint. We must confess ignorance of its true nature and of its etiologic connection. It is generally conceded to be congenital, though the misleading surname "ex-anopsia" still clings to it. That it can be benefited by operation is doubtful, "a pious hope rather than an assured expectation." (Noyes). That it does improve and in a short time disappear so that full acuity of vision is finally acquired in cases where, through accident, the good eye is destroyed, is illustrated by two cases reported by Johnson—one in the transactions of the American Ophthalmological Society of 1893, the second, in the *American Journal of Ophthalmology*, January, 1894. Why, then, does not the same good result ensue after tenotomy? For two reasons: 1, because the parallelism of the axis of the squinting eye with that of the other is seldom obtained—it is simply approximate and conjectural; and 2, there is no incentive to binocular fixation. The patient with sharp acuity in one eye will rely upon that eye for information of the outside world. The dull image in the cortex or visual center, even though that on the retina is accurately defined, will be recognized, if perceived at all, as an annoyance to be suppressed. A patient now under treatment, illustrates this point. Vision of L. is 20–15; R. 20–40. I have succeeded by various operations, in making the axes meet at several distances, but he sees the sharp clear image of the candle flame of the L. in the center of the large, indistinct, retinal or cortical image of the R., and instantly dismisses the latter by an inward or outward rotation of the R. The final result is only cosmetic. I can not agree with Fulton (Transactions, Ninth International Congress) and with Landolt, that vision of the squinting eye is improved after tenotomy, binocular vision being restored, and if the eye continues to squint, vision diminishes, but fully coincide with Wadsworth (*Boston Medical and Surgical Journal*, Jan. 20, 1887), that amblyopia is not caused by squint or that amblyopia improves after squint is corrected. I am inclined to go a step farther, and assert that convergent strabismus with amblyopia is seldom, if ever, permanently cured by tenotomy of the internal muscles and correction of ametropia, however accurate. Stereoscopic exercise, upon which Landolt lays stress, is a useful adjunct in restoring muscular fixation in heterotropia, by exercising weakened muscles, but is of very little service in developing the function of a congenitally imperfect eye.

2. The Refraction.—Seventy-five to ninety per cent. of convergent strabismus is found in hypermetropia. Snell (*British Medical Journal*, 1887) makes a higher proportion. He says convergent strabismus stands in direct connection with hypermetropia in 95 per cent. Donders has shown that the relation or connection between hypermetropia and internal squint is that of cause and effect, and his theory has been almost universally conceded to be the true one. Internal squint is occasionally found in E. and in M. In this small minority of cases it would seem as though some other hypothesis would be necessary, but this need is only apparent. It would doubtless be found as others have said, that hypermetropia preceded the M, and again where a myopic correction is worn, the strain on the accommodation of too high a glass—or the attempt to correct, subjectively, an existing astigmatism, may produce exactly the same effect on convergence as the effort to overcome a shortened axis. Again, some writers attempt to disprove the truth of Donders' theory by claiming, that according to it every hypermetrope should at some time of his life have internal squint. This objection can be successfully refuted. Valude (Archiv. d'Oph, Vol. x, No. 4), teaches the true doctrine of the relation of hypermetropia to internal squint, when he says that convergent strabismus does not depend upon ametropia alone, but that a neuropathic disposition is an important, sometimes the principal factor. Moreover, every one who has investigated the condition of the external muscles is convinced that esophoria is a very common anomaly in hypermetropia, and the phorias, or tendencies to squint differ from the tropias or actual turnings, simply and only in degree. The exceptions are rare when we find equilibrium in association with any material error of refraction. Thus we are again brought face to face with the incontrovertible fact, persistently and successfully advocated for the past twenty years, preëminently by the leading ophthalmic surgeons of Philadelphia, as was so ably presented to the Fellows of this College last spring by its honored President, that errors of refraction, particularly hypermetropia and astigmatism are the underlying cause of anomalies of muscular action and that no effort directed toward a restoration to equilibrium can be successful unless attention is first given to relief of accommodative strain by constant wearing of as near as possible a full correction of the optical defect. The general profession is under deep obligation to Weir Mitchell, Dyer, Norris, Thomson and others for the light thrown by their clinical studies on obscure intractable headaches and other disturbances of the nervous system, which showed that their cause was to be sought in accommodative or muscular strain. Ulrich concludes that squint is prevented in hypermetropia by reason of the muscles themselves through a relative weakness of adduction, corresponding in degree to negative accommodation or an absolute muscular incapability and the intellectual necessity of the visual act, which demand the fulfilled function of binocular vision and rebel against the disturbances of diplopia incident to commencing internal strabismus.

3. The Innervation.—Full binocular vision in uncorrected hypermetropia depends upon the accommodation, the convergence and their relation to each other. Whenever the desire for binocular vision is impossible of gratification, for instance, when excessive accommodation demands excessive convergence, or when the hypermetropia of one eye exceeds that of the other by several dioptries—2 to 4—or this desire has never existed, the axes of vision are turned toward, rarely from, each other. Thus we have two classes of hypermetropic squint—the alternating and the constant. Again, as has already been alluded to, the disturbance of the relation of accommodation and convergence in hypermetropia does not necessarily induce an obliquity of one of the axes, but may develop latent squint or esophoria. In the latter the desire for fusion is sufficiently strong to equalize, under pressure, abduction and adduction; in the former, abduction has yielded to the greater physiologic force of adduction. In normal muscular action and innervation, the muscles are in equilib-

rium—adduction equals abduction; R. sursumduction equals L. sursumduction, but, if by reason of the refraction of one or both eyes, unequal accommodation, or constitutional disturbances, the innervation or the power of the muscles to respond to the innervation become deranged, we have a pathologic condition of turning or tendency to turn. Here the tests employed under normal conditions to measure adduction and abduction are no longer reliable, and efforts to measure cerebral function, such as fusion force, by constant unalterable agents, like prisms, are attended with varying and inconstant results. Therefore to say that in heterophoria, adduction equals so much, abduction equals so much, and thus to estimate the strengths of the separate muscles is not consistent with scientific principles. While we measure adduction we are also measuring abduction. A prism angle held before one eye will, if not too high, induce contraction of the internal rectus, rotating the cornea inward. The opposite internal rectus will also be stimulated to contract, but if we want to hold single images the external rectus of that eye must contract equally to hold the axis straight. This, again, by stimulating, abduction excites the external rectus of the first eye in equal degree, or, the contraction of the internal rectus of the eye before which the prism is held, acting in lateral movement, stimulates the external rectus of the opposite eye. This can not rotate, but must be held fixed by its internal rectus, which in turn excites its corresponding external rectus in lateral movement in the opposite direction. Thus when we say adduction equals 20 degrees, we mean adduction and abduction are both equal to 10 degrees and each muscle overcomes 5 degrees. In testing sursumduction the same difficulties are met with and the physiology is still more obscure and complicated because eight muscles are involved in each experiment. In actual deviations of one of the axes, adduction and abduction can not be measured by prisms, since there is no binocular fixation and can be only approximately estimated by observation of the lateral movements of the balls. To learn the exact amount of deviation, it is essential: 1, that the patient shall be compelled by all available means to recognize double images of a candle flame at twenty feet and nearer distances; and 2, that the distance between the false and true light be measured by the angle of a prism or by lineal measurement. In manifest squint this distance will be found to vary but slightly from day to day, but in those cases which lie in the borderland between latent and manifest squint, when binocular vision alternates with diplopia the angular deviations are constantly changing, according to the innervation and fusion force exercised at the time of the examination. By this method of examination it will be found that in every case of internal strabismus, the squinting eye is rotated upward. The image of the candle flame will fall in the retina in a plane higher than the plane of the fovea, hence will be seen lower than the true image. In pure internal rotation the images should be on a horizontal plane. This can occur only when the patient's attention is fixed simultaneously on *both* images, a condition never found in manifest strabismus. In monocular squint, by which I mean cases in which one eye is always used in fixation and the other always is turned inward, the squinting eye is rotated obliquely inward and upward, and the false image maintains a position lower than the true. In alternating squint, where either eye may be used in fixation, the squinting eye is rotated inward and upward, and when the fixation is transferred to the former squinting eye the inward and upward deviation is also transferred. These phenomena can only be interpreted by pursuing to its proper conclusion Donders' theory of hypermetropic squint.

Abnormal convergence is induced through the supra-normal contraction of the ciliary muscle necessitated in the effort for clear vision. The stimulus thus received by the ciliary branch of the third nerve is communicated to the several nuclei of that nerve in the floor of the fourth ventricle and an order for corresponding contraction sent out to all the muscles supplied by that nerve. If this stimulus could be limited to the interni, simple convergence would result, but clinically, it is shown that the resulting contraction is far more complicated and includes the superior and inferior rectus and the inferior oblique. The simultaneous contraction of these muscles rotates the cornea upward and inward—inward because the opposing external is quiescent, upward, because the two elevators thus set into action overcome the one depressor.

In alternating squint, the transference of fixation involves necessarily a transference of the strabismus. The cornea of the squinting eye is directed inward and upward and not inward alone. The degree of hypertropia bears a constant relation to that of esotropia. I have never found it less than 2 degrees and often as high as 6 and even more. If Donders' theory is correct that primarily hypermetropia and secondarily the accommodation in hypermetropia induces squint, it follows that it must also be the cause of the hypertropia. This condition has often been observed and noted without explanation. I have deemed it a matter of sufficient importance to make it the subject of several articles: 1, because hypertropia is as common as esotropia; and 2, because cognizance of the upward deviation demands a modification of the usual methods of treatment, as well as of the prognosis.

I agree with Carter and others in believing that in all cases of internal squint in which operation is advisable, the tenotomy should be divided between the two internal muscles, and that no permanent good result can be obtained by confining the procedure to the eye which at the time of the examination squints. In constant squint, where the patient can never by reason of amblyopia, voluntarily transfer fixation, binocular vision can scarcely be expected, but the best result is obtained by tenotomy of the interni, the superior rectus of the squinting and the inferior rectus of the fixing eye. It may also be necessary to suture the external rectus of the squinting eye. In alternating squint, where amblyopia is never present and the patient arbitrarily chooses either eye for fixation, binocular vision can be obtained as a permanent result in the great majority of cases, by tenotomy of the interni. The want of equilibrium of the vertical muscles is only apparent and should not receive direct surgical treatment.

In all cases, without exception, the error of refraction must be carefully corrected and a full correction worn, and since the curve of the cornea has been known to be modified by tenotomy, the final correction should be made after operation. In very young persons, tenotomy should be postponed until suffi-

cient time has elapsed to demonstrate the futility of restoring binocular fixation by atropia, glasses, prism and stereopticon exercises and other measures.

My conclusions, scattered here and there through this somewhat rambling paper may be tersely stated as follows:

1. Amblyopia is congenital and not acquired; is not improved by tenotomy when high or of long duration; is always present in monocular squint; is not a factor in alternating squint; can be replaced by full acuity of vision after the hitherto good eye has been rendered by accident or disease inferior to the squinting eye.

2. In monocular constant squint the cornea of the squinting eye is turned upward as well as inward.

3. In concomitant or alternating squint, the non-fixing eye is turned upward as well as inward, and with transference of fixation there will be a transference of both the upward and the inward deviation.

4. Donders' theory, extended to include all the muscles supplied by the third nerve, and not the interni alone, is a sufficiently satisfactory explanation of the upward deviation.

5. Atropia and full correction are, in many cases, curative agents.

6. All operations should be done under cocain anesthesia.

7. In monocular squint, vertical equilibrium must be restored by tenotomy, while in alternating, division of the interni is sufficient.

THE MENTAL CONDITION OF ARTHUR DUESTROW.

A REPORT SUBMITTED TO HIS ATTORNEYS.

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At the instance of Hon. Charles P. Johnson, his attorney, I examined Arthur Duestrow, with a view to determine whether he was sane or insane. The circumstances to consider were that the client stood indicted for the brutal and motiveless murder of his wife and child; that he had been in confinement, in jail for several months; that he had manifested symptoms indicative of an abnormal mental state; and that the plea of insanity was the only possible preventive of punishment for his atrocious crime. These circumstances made it obligatory upon me to examine him with special reference to the possibility of his feigning insanity as a means of escaping the legal penalty that threatened him.

I visited the prisoner several times in the jail at the Four Courts in St. Louis. He received me kindly and was on all occasions when I was with him polite in manner and remarkably communicative. He always expressed himself with freedom and with every outward sign of sincerity. He willingly submitted to my physical explorations, and gave me every opportunity to satisfy myself.

Physical Examination.—He was 26 years of age, and his appearance accorded with his years. He was in a fair state of bodily nutrition, though he weighed several pounds less than he did at the beginning of his incarceration. Height, nearly six feet. His color was good, and his circulation perfect. The heart was found to be normal; pulse rate, normal. There were no signs of pulmonary disease of any kind. His appetite was excellent and there was no evidence of gastro-intestinal disturbance. There were no symptoms to indicate a diseased condition of the kidneys. His general physical development was good, the muscles were quite firm and fairly developed, considering his past confinement; the skin presented no anomalies. Inspection revealed no marked physical sign of degeneracy. His head was slightly above the average size, and presented no asymmetry. The ears were well formed and the jaws did not deviate markedly from average standards in form.

Nervous System.—There was no indication of paralysis, paresis or incoördination; no tremor. Cutaneous sensibility was normal. The knee jerks were present and equal; the pupils reacted normally to light and accommodation, and were of equal and normal size. Articulation was perfect—distinct, unhesitating; no fibrillary twitching of tongue or lips. Sight and hearing were perfect, and there was nothing to indicate anomalies of any of the special senses. No complaint of pain of any kind was made, nor of vertigo. There were no scars indicative of epilepsy.

From these findings I assert that Arthur Duestrow was not suffering with any functional or organic disease of the peripheral nervous system or spinal cord; that there was no organic cerebral disease in his case; at least that the presence of such anomalies in him were not discoverable by any means known to science. Thus the only remaining possibility of disease was that of functional cerebral disturbance.

Cerebral Functions.—Emotional state or feelings: There was no sign of depression of feeling—an absence of all the outward expressions of a feeling of sadness or melancholy; the emotions changed with the change of thought, showing no sign of affective inhibition. In striking contrast with such a possibility, his mood, or state of feeling was, on the whole, one of mild expansiveness, expressed in an unmistakable show of satisfaction with self and a manner indicative of a sense of superiority to others.

This emotional state was one that could have no rational root in his circumstances. He was in confinement, deprived of all the amenities of life, associated with the lowest class of men and awaiting trial for his life. Instead of remorse, sorrow, anxiety, fear and depression, his manner, facial expression and conversation revealed a state of mental feeling in striking contrast with these. Had he been an innocent man he would normally have had great cause for fear, since in the newspapers which he received daily he read of the intense popular prejudice against him; as a malingerer, he would necessarily have recognized the small chance of escape he had, even though he simulated insanity to perfection. All these circumstances tending to bring him to some expression of doubts, fear or anxiety for his future, were absolutely without their normal effect on him. On the other hand, the absence of these natural feelings was not occasioned by indifference of his future. The ideas he expressed were in complete accord with his general mood; he was hopeful, ambitious, proud and self-assertive, and the ground for all these was evident in the thoughts he freely expressed, which, at the same time accounted for the apparent absence of remorse and regret. His feeling of satisfaction was so marked and so predominant as to perfectly withstand the presentation and emphasis of facts which would dispel it in any normal person; pervading

consciousness so exclusively as to overcome any tendency to irritation and anger that would naturally flow from strenuous contradiction and opposition to his views. If this remarkable state of feeling was assumed for the purpose of deception, it was done with a perfection and unchanging persistency that absolutely defied its differentiation from a genuine emotional state.

Aside from this state of mild emotional expansiveness, there was no exaltation of feeling in any way resembling the emotional state, characteristic of mania and maniacal states. Therefore, I pronounce the prisoner free from mania and melancholia, and from any disposition to feign either of these.

To form a judgment of his intellect, conversation was used to test his powers of perception, attention, memory, imagination, reasoning and judgment. His perceptions were lively and more or less accurate; he had fair power of attention, his thought was quite clear, his reasoning logical, and he displayed remarkable activity of imagination—all with reference to the premises which formed the material of his mental operations. He entertained a great variety of ideas of intricate construction and complicated association. These facts were sufficient to demonstrate that the prisoner was not afflicted with any form of mental weakness or confusional insanity, and that he made no effort to simulate such a disease. The forms of insanity incident to the originally normal brain having thus been excluded, the inquiry became reduced to the existence of the real or feigned existence of some degenerate form of mental disease. Of these forms, the foregoing considerations, taken with other evidences—which need not be enumerated—have already excluded all but one; namely, depressive reasoning insanity, periodical and circular insanity, and the mental diseases from the neuroses, epilepsy, hysteria, etc. Thus by exclusion it was certain that he was sane, or had or was feigning the only remaining form of degenerate insanity—paranoia.

Paranoia is the name of a *chronic progressive* mental disease, usually manifested in systematized delusions that are of primary origin; that is, delusions that do not arise out of preceding mental depression or exaltation. Commonly this disease is a result of conditions inherent in the brain organization of the individual which determine the form of the disease. Study of cases of paranoia shows that there is always a history of mental symptoms which antedate the development of the perfected delusions, and often other symptoms of a vicious constitutional state of the nervous system in general; and to these are added in many cases the existence of nervous and mental diseases in ancestry that have been influential through heredity. However, paranoia may arise in persons whose heredity is in nowise at fault, and in this case it is usual to find that some decidedly injurious influence has affected the individual early in life in such a way as to lastingly and inherently harm the nervous constitution. Since the constitutional defect which underlies paranoia is imperfection in generation and development, paranoia, with other mental diseases of like origin, is called degenerate. The degeneracy at the bottom of paranoia varies in degree, and we observe corresponding variations in the mental symptoms. Thus the deeper the degeneracy, the earlier the mental disease appears, and the more sure and rapid is the progress to a condition of permanent mental weakness.

The delusions of paranoia all concern the person directly. They are of two kinds: Delusions of persecution and delusions of grandeur. Again, the earlier in life paranoia appears, the greater the chance that the delusions will be of a grand character; hence primary delusions of grandeur indicate deep degeneracy and presage early development of permanent dementia. Arising late in life, the delusions of paranoia are almost certain to be of a persecutory nature, and their character may remain unchanged through out life. Where primary delusions of persecution arise early in life and are on a deeply degenerate foundation, they are apt to change in character, and this change affords a trustworthy indication of the further course of the malady. This change of delusions of persecution is called the *transformation*. This consists of a change of primary delusions of persecution to delusions of personal aggrandizement. The transformation, whenever it occurs, is a sign that dementia will ultimately come on, and the earlier it takes place, the more rapid the progress to mental weakness will probably be. When the transformation has taken place, there is not necessarily an entire absence of the former persecutory ideas; rather they are overshadowed by the grand delusions. Occurring with the change of ideas, there is a corresponding change of feeling. While persecuted the paranoiac is morose, sullen, silent, suspicious, treacherous and often violent; after the transformation, he becomes talkative, friendly, self-satisfied, proud and important, and may even go so far as to excuse his former imaginary persecutors.

The process by which the transformation is accomplished varies. It may result from a chain of reasoning; it may take place suddenly as a result of an hallucination, a dream, etc. Whether the result of a reasoning process or not, the secondary delusions of grandeur are always intimately logically connected with the primary delusions of persecution. Thus one person concludes, as the logical outcome of his persecutions, that he is entitled to some great privileges of honor, position or fortune which usurpers are in the enjoyment of; and he attributes his persecution to those who occupy the place which he fancies belongs to him. Under appropriate surroundings of life and circumstances of education paranoiacs, after the transformation, become in their thought kings and princes, religious reformers, political enthusiasts, heirs to great estates, great inventors or discoverers. Love plays a prominent part in some cases. It is customary in text-books to make numerous classes of paranoia in accordance with the particular nature of the ideas expressed, but such subdivisions are of very minor importance; and besides in a single case we frequently find a combination of ideas which would require very numerous descriptive terms. Thus in all cases of paranoia, we find sexual elements; we rarely miss a distinct philanthropic motive, after the transformation; religious ideas are but exceptionally wanting; and political views of a delusional character are as common. The reason for this expression of false ideas on so many subjects lies in the fact that the whole mental personality is implicated, and therefore all thoughts and experiences are necessarily and intuitively brought into harmony with the fundamental mental tone.

In paranoia the logical and associative powers of the mind are not necessarily impaired; rather mental associations are facilitated as a result of the extra-

ordinary intensity of consciousness characteristic of the disease. This intensity of consciousness of a direct personal kind accounts for the instantaneous mental assimilation of all ideas, no matter how incongruous or contradictory, and the forcing of them into immediate association and logical relationship with the predominating delusions. Such a phenomenon as this is only possible before much mental weakness has supervened. This automatic assimilation of incongruous ideas shows that in such a case all power of critical examination of facts has been lost; and thus even here there is actually loss as well as distortion of mind.

Hallucinations and illusions, while not a necessary accompaniment of paranoia are rarely wanting, and when present they afford important sources for the creation and elaboration of false ideas.

It now remained to determine whether the prisoner presented a mental condition like that present in paranoia, and if so to ascertain whether it was a product of disease or voluntarily assumed to deceive.

The expansive mood previously described as presented by Arthur Duestrow, corresponds in all its features with that observed in cases of paranoia after the transformation has taken place. In this case the state of feeling was out of all harmony with actual external conditions. Was it in harmony with ideas entertained by the prisoner?

The prisoner's conversation was free and open; there was nothing in his manner to raise a suspicion of a lack of frankness; his mien was open and straightforward. Thus there was no difficulty in inducing him to be as communicative as desired. Without prompting, he went into a detailed description of ideas and experiences of a very remarkable character. He said that he had made the greatest discovery of modern times; namely, the fact of mind-transference and the ultimate possibilities of hypnotism and animal magnetism. By means of this discovery he was about to revolutionize all medical sciences, and liberate the world from crime, vice, and maliciousness. His discovery made clear to him much in his own life that had before remained inexplicable. Hypnotic influence and malicious thought-transference had been used by his enemies to control and persecute him. Thus he had been induced to drink, and injure his wife and child. After his incarceration began, the same influences had been used to persecute and annoy him constantly, thus driving him to attempt suicide. Machines, telephones, batteries, etc., had been used in this way, by placing them in hiding in his cell and elsewhere; and he had been made to have hallucinations and delusions by the same means. This state of unmitigated persecution had continued until he had suddenly discovered the nature of the means used and the great preventive to overcome their malicious use. Since this sudden discovery he was still the object of persecution, but he obviated its effects by using his great preventive. He explained the prevention now as the natural consequence of his being a great pioneer in a new field, likening himself in this respect to Christ, Columbus and others. In this influence of hypnotism, thought-transference and animal magnetism he found an explanation of all diseases and the way to cure all diseases. He gave the details of an elaborate and impossible theory of the relation of the spleen to the "glandular system," the blood, the body, the convolutions of the brain, and its effect to cause and cure disease by means of animal magnetism. His preventive consisted in his knowledge that possession of the "positive and negative sparks" would keep off the influence of "malicious thought-transference. He had become so accustomed to use this preventive that he could apply it effectually even in sleep, to save himself from persecutors who sought to gain control of him by exercising their influence on him while he was presumably unconscious and unable to protect himself. He asserted that all persons who in any way looked like him, had the same thoughts, the same feelings that he had; that when he was persecuted, those like him were similarly annoyed and controlled. He explained an elaborate system of colored sparks which evidenced great imaginative ingenuity. He sought to show how he could anesthetize a person at a distance by taking chloroform himself and transferring its effects by means of thought. Since his discovery he had become able to exercise the influence on any one. He could make any person do what he willed, think any thought he desired, read their thoughts, etc., etc.

The prisoner made several attempts to display his boasted powers which was successful only in his confiding imagination. These attempts were offered as demonstrations of the truth of his assertions. He tried to tell the hour by means of the mind of a third person in sight of a public clock; to transfer the odor of a rose from a flower-shop blocks away. He told of various vulgar acts to which he had forced others by his power. There was a sexual tinge in much that he said. His discovery had enabled him to read the thoughts of men the world over, and thus he was able to foretell human events. In this way he had learned of his elevation to a high position as surgeon in the army; of his relationship to certain aristocratic persons in Germany; of his election to the College of Jesuits by the Pope for services in revealing the dire designs of members of the Church of God directed against the Church of Rome. Moreover, by the use of his powers he had converted all the physicians who deemed him insane to complete recognition of his sanity. He told how, controlled by malicious thought-transference, he had been made to shoot his wife and child, but explained that the wounds were merely superficial and that they had recovered and now understood what had forced him to act so unnaturally; he had seen his wife and child (illusions) and was therefore convinced that the proceedings against him were a farce and about to be dismissed. The effort to prove him insane was but a ruse of his enemies who sought to influence the lawyers and doctors and make them believe him crazy, in the hope to get him into an asylum. He would show at his trial that he was sane and all the doctors insane. He gave a history of himself which showed that he had repeatedly had illusions and hallucinations, and while under examination he frequently gave signs of having rudimentary hallucinations. His description of hallucinatory experiences was remarkable for its originality and for its perfect correspondence with that given by insane persons of their mental phenomena.

This recital of his ideas might be much further extended, but such a narrative could add nothing to the foregoing exemplification of the general nature and character of his intellectual operations.

The prisoner's description of his life in jail and the evidences at hand, showed that at the beginning

of his confinement he had delusions of persecution and hallucinations; that his mood, corresponding with these, was then silent, sullen and suspicious; that suddenly, after some months, a change had come which was the inauguration of his present state of thought and feeling. The persecutory ideas had persisted but had become subsidiary to the grand delusions and logically connected with them.

No kind of contradiction or demonstration caused him to change countenance or modify his views and assertions. There was perfect harmony between his grand ideas and his expansive mood.

The manner in which the prisoner conversed and defended his impossible and absurd notions was remarkable for the readiness and rapidity with which incongruous ideas and facts were accepted, distorted and explained from his delusional standpoint. The effect of trivialities in their suggestive relation to his mental operations was at once a matter of surprise and wonder to one observing it. It could not be adequately described in words. Never was there anything thus exhibited in any way out of harmony with his predominating state of consciousness. These were the most striking features of his mental condition taken with the constant display of his lack of critical powers.

In his ideas we find delusions of persecution, personal aggrandizements, sexual tinge, religious tendencies, philanthropic schemes, etc. He gives evidence of having had all the symptoms of the developments, course and transformation of the mental state seen in paranoia; of having at present the symptoms characteristic of that disease after the transformation has taken place. His hallucinations and illusions are characteristic in their minutest details of that malady. The instantaneous assimilation of all kinds of sense impressions and ideas, and their immediate harmonious association in consciousness, are again characteristic of certain stages of paranoia. Throughout all the system of symptoms he presents there is a perfection of harmony in their combination that leaves no doubt that he exhibits an exact portrayal of a definite type of mental disease, and that the type is paranoia. Were these symptoms feigned? Since they correspond in minutest detail in development and course with a very definite form of disease; and since they are of the greatest complexity, if feigned, their presence betokens the most profound knowledge of insanity, which could come only after years of study and observation of the insane in constant association with them. Such a knowledge could not be gained from books, much less imparted by word of mouth. If the prisoner can be shown to have spent years with the insane, and to have a mind far above the average, we may allow, for the nonce, that he feigned these symptoms. Allowing this, we should expect an absence of all the ordinary signs of feigning, as we do in this case. Allowing that the prisoner is simulating, with such a profound knowledge of insanity he would certainly choose an easier part to play. Mere delusions of persecution would serve the purpose of a simulator as well; there would be no need to go through the transformation; no need to bring in all ideas—sexual, religious, philanthropic, etc. However, in the symptoms presented by the prisoner there is an element which no person could successfully simulate, no matter if a master in knowledge of the insane mind; namely, that rapidity of reception, association and delusional interpretation of all external impressions, experiences and ideas, no matter how inharmonious or contradictory they are in fact;—a process in which there is never any flaw, never anything incompatible with the fundamental state of consciousness. Such rapidity of assimilation and association of mental impressions is seen in other forms of mental disease, but never with the logical connection and systematic creation of mental combination that characterize it when present in paranoia.

The presence of this element, associated with the other mental symptoms in this case, is positive and unmistakable evidence of disease, and as positive evidence of an absence of feigning. In any case of feigned paranoia this element would necessarily be lacking; for it is impossible for a normal mind to act in this way. The normal mind, in possession of its ordinary critical powers is, as it were, by a psychologic law, forced to exercise criticism—to compare, weigh and consider; this requires time, and is shown outwardly in hesitation, delay, uncertainty, and equivocation in the expression of judgments. The paranoiac's mind, devoid of the power of criticism, has no need to weigh or consider; as it were, the explanation of any possible event that can be presented to his mind is ready, created before the event is perceived. In other words his mind receives everything automatically, is never surprised or led away from its predestined path of activity. The reason for this peculiarity lies in the fact that the operations of the mind of the paranoiac are directed by inner cerebral conditions; whereas, in a normal mind the mental activities are constantly modified by the logic of impressions coming through the senses. This process peculiar to the mind of the paranoiac, is involuntary and incapable of voluntary imitation.

The origin, development and transformation of the prisoner's delusions are sufficient to demonstrate their relation to disease; but it might be objected that some other proofs were required to show his false ideas to be insane, rather than sane delusions; for a delusion *per se* is no sign of insanity. A sane delusion is a false belief that has arisen as a result of teaching, ignorance, or erroneous interpretation of experience. Such a delusion may be so tenaciously held as to resist all powers of demonstration and argument, and require a course of careful education to eradicate it. A sane delusion may at any time become an insane delusion, when appropriate conditions arise in the individual. For example, many normal persons entertain delusions concerning so-called thought-transference. Under normal conditions this error has merely an abstract value for the mind that entertains it; it bears no concrete and immediate relation to the individual. To become an insane delusion such a false belief must be brought by the mind into direct bearing upon its operations; the person must find within himself reasons which convince him of this relation —he must interpret inexplicable inner events, activities and sensations as due to the operation of the influence which he has previously believed in only in an abstract and impersonal way. The changes within himself may be normal or abnormal; the absence of critical power which enables them to be brought into immediate relation with the false belief is always due to a diseased mental condition.

Thus in the prisoner's case, his delusions are insane

delusions because, in the abnormal absence of critical power, he brings them into direct relations with events, sensations and phenomena which are present only in his inner consciousness. These facts are sufficient to show beyond a doubt that Arthur Duestrow is insane, that he is suffering with paranoia, and that he is incapable of understanding the nature of the trial he is approaching.

I have never seen or heard of recovery in a case of genuine paranoia. I am confident that in this case an examination of the ancestral and individual history would reveal the degenerate basis of the malady. Remembering the comparatively early age (25) at which the disease reached complete development, the rapid and early completion of the transformation, and the absence of critical powers, it seems probable that dementia will supervene with comparative rapidity. By this, I mean as compared with the oncoming of dementia observed in ordinary cases of paranoia. It may be several years before the mental weakness becomes so apparent as to strike a lay observer. "Acute paranoia," so-called, is a curable disease, but to apply the word, paranoia, to any form of acute mental disease is to do violence to scientific nomenclature; there is no reason to regard this case as one of acute mental disease.

Aside from the probabilities mentioned, there are other possibilities that must be considered in this case. In any case of paranoia, remissions of short or longer duration may occur, and in such an event there is an apparent return to mental health for a time, but always ultimately the symptoms reappear, and the former delusional creations are again taken up and further elaborated. Moreover, a paranoiac may at any time simulate sanity, and that so successfully as to deceive all but the most experienced observers. The simulator of sanity reasons in this manner: "As long as I talk about my ideas, they will think me crazy and deprive me of freedom; therefore I'll conceal my ideas and accommodate myself to those who restrain me." This ruse is only too frequently successful in bringing about release from custody, and numerous paranoiacs have thus hastened from the asylum to kill some person representing an imaginary enemy. The ideas of the paranoiac are not necessarily "fixed" or unchangeable, and therefore it is to be expected that those at present entertained by the prisoner will alter more or less in time, though their general nature will not change until permanent dementia has supervened. A paranoiac may, like any man, become subject to an organic disease, such as paretic dementia; or his fundamental malady may become complicated by some acute mental disease.

Such a consideration as this, suffices to show the utter absurdity of defining a paranoiac as a person whose opinions differ from those entertained by the majority of mankind. Opinion, like a delusion, can never be a sign of insanity until it can be shown to have a foundation in disease.[1]

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[1] In this report, the legal requirements restricted the writer to the condition of the prisoner subsequent to the homicide; thus an important part of the medical aspect of the case was excluded. The facts, however, show that there is alcoholism in immediate ancestry, and hysteria in immediate collaterals. The previous history of the prisoner shows marked mental dullness, delusions of suspicion, sexual perversity and intolerance of alcohol. The double murder was presumably connected with a state of alcoholism, and the fully developed mental distortion was manifested immediately after the murder. Thus far it remains uncertain whether the crime was directly the result of delusions, or the deed of an insane man excited by a triviality to ungovernable rage.

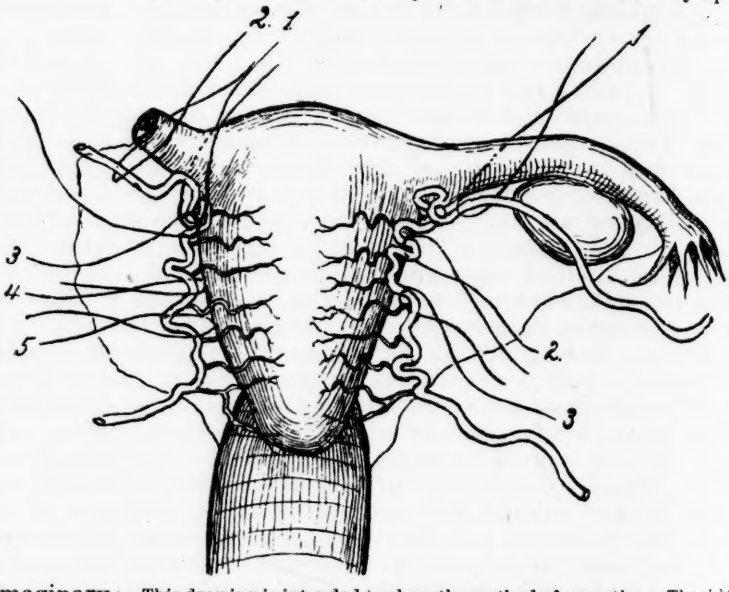
REMOVAL OF THE APPENDAGES AND LIGATION OF THE UTERINE ARTERY TO THE UTERO-CERVICAL JUNCTION.

REPORT OF THIRTY CASES OF A NEW OPERATION.

BY BYRON ROBINSON.

CHICAGO.

The above operation I introduced about two years ago. The technique consists in ligating the appendages and then snipping them off. An aneurysm needle armed with a double ligature is then passed through the broad ligament at the cervico-uterine junction on the inner side of the uterine artery. The one ligature is tied along the side of the uterus including the perpendicular arteries of the uterus, the Fallopian tube, round and ovarian ligaments. The other ligature is tied on the broad ligament including the ligamentum infundibulo-pelvicum. Another method consists in ligating and removing the appendages and then simply ligating the uterine artery once or twice as it courses through the broad ligament by the side of the uterus as low down as the neck. The first method is the best, as it atrophies not only blood vessels but nerves and ganglia. We have ligated the uterine artery down to the cervico-uterine junction in nearly all of the cases. No symptoms of tissue death in the uterus have so far appeared in any of the cases. In some cases pain is severe from twenty-four to forty-eight hours, but it seems due to trauma by the ligatures on large numbers of nerves and ganglia. This pain can be quieted with $\frac{1}{16}$ gr. morphin once or twice, for the main pain is generally over in fifteen hours. This operation can be widely applied in surgical gynecology. It pro-



This drawing is intended to show the method of operation. The right tube and ovary have been tied by ligature 2 and removed. Ligatures 1 and 3 are introduced on an aneurysm needle and tied. Ligature 4 shows the lowest point at which I have ligated. Ligature 5 might be considered to be within the danger line. The left tube and ovary have not been removed, but ligature 1 includes the tube and artery. I have ligated the uterine artery as low as the point indicated by ligature 3 on the left side. The drawing is somewhat diagramatic, but the arteries are as natural in their position and relations as I could draw them. Lately I have only used one double ligature to ligate the artery fully as low down as No. 5.

duces sufficient shock on the circulatory and nerve apparatus to quickly atrophy growing uterine myomata. The effect of ligating the uterine arteries as they course through the broad ligament is to atrophy the endometrium rapidly—checking endometrial secretions and hemorrhage. The pelvic floor is preserved intact by this operation, obviating the danger of vaginal hernia.

In a vaginal hysterectomy made by Dr. Lucy Waite with my assistance, a vaginal hernia followed several months after the operation. This operation brings on the menopause rapidly. It followed in two months in one case. The operation leaves a functionless, atrophic, normal positioned uterus, which so far among our patients has given no trouble. This report is based on thirty operations made during the last twenty-six months. In several of the cases I assisted Dr. Lucy Waite and Dr. Bertha Van Hoosen, and include them in the report. The utility of the operation consists in the following points:

1. It checks hemorrhage.
2. It arrests menstruation.
3. It elevates the uterus.
4. It shrinks the uterus.
5. It avoids the removal of uterine myoma.
6. It avoids vaginal hernia.

We have proved that the operation is suitable to every one of the above six propositions. Dr. Van Hoosen reports that not one of the cases in which I assisted her in operating has menstruated. I know of not a single case in which Dr. Waite and I operated where menstruation continued. We removed the appendages and tied the uterine arteries on a patient 37 years old, with a myoma extending above the pelvic brim. Three months later the tumor was decreased one-half; eight months later the uterus is what I should term almost normal in size. The operation shrinks the metritic uterus, which nearly always accompanies suppurating appendages. It shrinks the endometrium so that excessive secretions are checked. I have proved the shrinking or atrophying of the large, hard, metritic uterus, time after time, by subsequent examination. The operation elevates the retroverted uterus and maintains it in position. It is superior to hysteroexey, as it leaves a movable uterus.

Two months ago I operated with Dr. Verity, of Chicago, on a case with diseased appendages, and with a large, hard, retroverted metritic uterus. We removed the appendages and tied the uterine arteries almost down to the cervix. Eight weeks subsequent to the operation I examined the patient and the uterus was in distinctly normal position; it was movable and had shrunk at least one-third in size. Two objections might be raised against the operation:

1. The danger of gangrene.
2. The ligation of so much tissue.

I do not consider it an objection that one might penetrate the bladder with a ligature armed needle, or a ureter might be included in the ligature, as any other operation is encumbered with similar dangers. The idea that the ligatures might become infected and produce subsequent fistule, is not a serious objection. I would suggest that the ligature which includes the broad ligament should not include the Fallopian tube with its mucous membrane, as that might enhance the chances for suppuration. The needle could be passed just beneath the tube. This method ought not to protract the operation more than ten minutes. In the thirty cases, one patient died from the results of the operation. The patient was a weak, worn-out woman of 37, who had a myomatous tumor for some six years. The broad ligament was tied in sections and the tumor shrank so rapidly in four days that it produced a kink in the bowel by dragging on it. The bowel was not completely obstructed. The patient went on well for four days, after which she suddenly sank in a few hours, without many symptoms. An autopsy revealed the fact that in four days the tumor had shrunk enormously, and a kink was found in the bowel. The debility of the patient and the worn-out nervous centers were to blame for this death. The other death among the thirty cases was due to urinary suppression on the sixth day in a woman who had almost flowed to death during six years with a large uterine myoma. The case progressed well for six days after the operation, when the urine ceased to be secreted and she died about thirty-six hours later.

THE SURGICAL TREATMENT OF INJURIES OF THE HEAD.

TREPHINING FOR CLOT AND PRESSURE SYMPTOMS—NO FRACTURE.

BY R. E. HAUGHTON, M.D.

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In view of the great apparent progress in cranial surgery, in many forms of disease as microcephalus, idiocy, hydrocephalus, tumors, compression, clots of blood, cases where a transmutation of structure may take place, viz., hyperplasia of connective tissue, neuroglia of Virchow or glioma, I report a case to show what may be accomplished in the earlier stages of severe injury in aid of a final recovery. We must in some degree comprehend the structure and anatomy of the relations of the brain, how protected by its membranes, its bony case, its supply of blood within and without, the sources of blood supply internal and external; and comprehend the dilatation and contraction of the vessels under vasomotor influence, the reflex irritation upon vessels, the difference of cause in coma of compression and cause of irritation which may be reflex or direct, the relation of blood supply to connective tissue, before we are in any sense, in a condition to comprehend the many varieties of symptoms which present themselves, as in disease or injury, which progresses to very serious results. The result of experimentation upon the brains of mammalia with organizations much inferior to man, leave many questions as yet unanswered in regard to the human brain.

The diseases of motility, speech, sensibility and special sense all require a large comprehension of a very large number of pathologic facts which have been so far utilized in connection with the more recent developments in histology, so that to some extent a clinical summary is being reached which enables us in a measure to make out a clinical or surgical diagnosis with some degree of certainty.

Again, cerebral lesions are revealed by symptoms which when classified, enable us with some certainty to reach a diagnosis, for instance, we find a large

group of symptoms which are cerebral or cephalic, which are an entire departure from normal conditions and which, though beginning as to brain, produce disturbance of function of one-half of the body. Consciousness is in entire abeyance, and we have excitement, incoherence, delirium, or we have the opposite conditions of entire absence of brain power in any manifestations of intellect, or if any brain intelligence is manifest there is a complete abolition of motor power by which the senses operate externally. Paralysis of motion and sensation, especially on one side of the body, indicate physiologically, the crossing of fibers as they pass to the cord by way of the medulla oblongata, so that we begin to locate and classify symptoms. Irritation of motor functions, shown in stiffness, spasms or rigidity, clonic or choreic convulsions, with derangement of coördination or tremors of a limb of one-half of the body. The peculiar group of cerebral paralyses are less often produced by hyperemia or anemia of certain brain regions than by localized lesions of a sudden or acute character, viz., hemorrhage, serous effusion, inflammation and results, or hemorrhagic clot and compression because of a more or less widely diffused injury. In addition to these in immediate origin are the results of primary and secondary lesions causing arrest of motor or sensory impulses, because the paths or lines of transmission are injured, compressed or destroyed. The doctrine of localization of function has done much to clear up our ideas as to the relations of certain, local and definite functions residing in a special part of the brain, and thus following out the demonstrated relations of function we are enabled to clear up the diagnosis.

It is well recognized that the hemiplegic type of paralysis upon the opposite side to cerebral lesion is due to disease of motor centers as corpus striatum and lenticular nucleus, or to localized lesions of the cerebral lobes involving the peduncles and pons-varolii. The paralysis of one-half of the body appears in the muscles of the limbs, the extensors and the contraction of the antagonists. The muscles of the paralyzed side generally undergo no noteworthy change in electric sensibility.

This and much more might be said in reference to the varying conditions which may obtain in case of an injury which may be first, concussion, followed at once by symptoms of compression, which may and often does require surgical diagnosis and operative measures to relieve the compression, as in the case I am about to present:

Case 1.—Mr. W., a citizen of Midland and a cattle man, had gone out to his ranch to look after his cattle. He rode a horse which was not well broken, and for some reason, not known the animal reared and threw his rider, his head coming in contact with a pile of stone, which struck him about the superior margin of the left parietal bone near the parietal protuberance, producing a contusion of the scalp and also cut down to the bone. His skull was supposed to be fractured, by the physician who was called out to see him and he adhered to this opinion. On the second day Mr. W. was brought to Odessa and from there by train to Midland, a distance of about forty miles. During the time which elapsed from his injury, he was unconscious, paralyzed on the entire right side, stertorous respiration, pulse slow and labored, with difficult respiration at times and spasmodic action of the muscles of the same side as the injury, viz. left. Pupils dilated at first were afterward contracted. Functions of bladder and bowels arrested, except a stillicidium or dribbling from the bladder.

Diagnosis or Summary.—Concussion with compression of brain as shown by all the leading symptoms. Shock had been marked from the first, yet a sufficient reaction was secured to move him as before mentioned, as no operative procedure could be instituted on the ranch. On Feb. 19, 1893, I was called into consultation with Drs. E. and C., just after night as he reached Midland, at nearly dark. The decision was reached that in an operation to determine whether there was fracture, a depressed fracture, it was necessary to elevate the bone, and relieve the pressure as it was a case of compression, though no fracture could be found. It was also determined by the consultation to operate for two reasons: 1, to determine as to the existence of a depressed fracture; 2, if this did not exist to trephine for the purpose of removal of a coagulum of blood, as it was *assumed* this also might exist from the nature of the injury, and as well from all the symptoms.

On the following morning February 20, we saw the case and proceeded to make an exploratory operation as to fracture, dissected up the scalp for the purpose and clearly demonstrated that no fracture existed. Then we at once proceeded to trephine at the point of contusion to find the cause of compression. We removed a small circle of bone, including both tables and upon its elevation the blood began to well up into the opening, very much as water wells up into a well when you reach it. The blood had not coagulated as it was occasioned by the rupture of divisions of the middle cerebral artery or parietal ascending branch. The dura-mater was carefully protected while using the trephine, hence the blood was from the artery, the middle "ascending parietal artery." There was a large amount of blood which was taken up by small sponges as it filled the opening. When this had been removed there seemed no clot in sight or on touch. The dura mater was intact so that we proceeded to close and dress the wound antiseptically. One suture was placed by a silver wire at the apex of the flaps and the wound had an antiseptic solution of peroxid of hydrogen and bichlorid of mercury in water, 1 to 2000 with light compress and bandage. The wound healed readily without suppuration, and the symptoms of compression slowly passed away. The patient after careful nursing, has recovered so he is working and transacting business, and was able to ride and walk in a few weeks after the operation. Since his recovery he went to Buffalo, New York, to the Surgical Institute to consult (as he believed) abler counsel than he could find on the plains. He came as he went, being informed that so far as surgery was concerned all had been done that could be done. I had an opportunity to determine his condition as he rode out in a buggy as soon as able, and one man who frequently took him out said to me: "He knows a fat steer and its value, and whether he owns it as quickly as he ever did, as I tested his capacity in that direction."

Some questions now arise as to the diagnosis, and in explanation of some if not all the principal facts in this case, it should be remarked here that we have had this year three cases of injury in the head, two of them recovering without any operative procedure, being only concussion of the brain. All of these cases were produced by falls from horses, two occurring in the night and the one here recorded in the day time.

The physiologic and pathologic fact existed of hemiplegia from the injury. This fact indicates, that compression of the fibers or cells of the left parietal convolution as they pass down into the medulla are transferred to the opposite side and (*vice versa*) when the injury is upon the other side. This was the principal fact which guided in this operation and which coincided with the second fact that the ("*pt-de-appui*") or site of injury was on the left, hence other things being equal we should find the compression under the injury.

Again, when we come to make up a diagnosis as to the clonic convulsive action of the same side of the injury, "the hemiplegic type of paralysis upon the side opposite to the cerebral lesion is due to disturbance of the motor ganglia, corpus striatum and lenticular nucleus, or it may be due to localized lesions of the cerebral lobes involving the peduncles and pons varolii."

Again, when hemiplegia occurs upon the same side as the cerebral lesion, a center is found in the motor

ganglia of the opposite side with alteration in the lobes of this side, and it may be with edema or pressure from blood in the parenchyma of the structure of the opposite side. We had a partial hemiplegia on the same side of the injury, but it was not persistent or permanent. This was accounted for from the fact that the concussion by a *contra coup* may have produced small foci of blood deposit and induced the condition of the side injured, or incomplete hemiplegia with startings or twitchings and spasmodic action of the muscles of the arm and leg of the injured side.

I have said the patient was trephined at Midland, and has slowly recovered, regaining such measure of power, intellectually and physically, as to walk about town with a cane yet with irregular, somewhat spasmodic action of the muscles of the limbs below, showing that he has not yet fully recovered the motor control of certain sets of muscles. I believe he will continue to improve in this direction until a fair use of the muscles may be regained.

Later, Jan. 1, 1895, he is still improving, and now superintending and building a large four-story hotel.

Surgical appreciation of methods and operations in traumatic and intra-cranial lesions without fracture. We have already come to a conclusion as to operative methods in cases of fracture, especially with depression of tables and clots of blood which may form in such cases, as in elevation of depressed bone and removal of loose or detached fragments. That is, relieve (*brain pressure.*) This leads us to another step. What shall be done with cases of intra-cranial lesions (traumatic) in which no fracture exists, as was clearly demonstrated in this case? Evidences of compression were clear, yet no fracture existed. What could cause compression? Two conditions clearly; effused blood which may be found beneath the injury of the surface, and points of effusion, (ecchymosis punctatæ diffusa) and, finally, fracture by *contra coup* might arise where lesion or force is sufficient. While cerebral localization may not and most probably will not always indicate the spot at which the cranium may be trephined, nevertheless in such a case as I have here described the demand is none the less as imperative as in cases of depressed fracture, as compression by extravasation of blood exists in both cases and in the first class of cases, bone is also depressed. What are the facts in cases where post-mortem examinations have been made?

1. Death occurs in all ages and conditions from such head injuries, without fracture of the skull, and the facts thus shown prove that a large per cent. of cases dying from brain fever and meningitis, especially in children, are the result of inflammatory action about a clot, producing abscess or softening due to some degeneration of injured cerebral tissue. Hence we may deduce a rule of action, that because these cases are not found accompanied by fracture there is certainly no good reason why they should not receive surgical attention, as they are amenable to treatment, as this case shows. Reports of cases, as I have gathered them up, show that the most grave cerebral lesions, manifested by very grave and serious symptoms, are produced without the slightest solution of continuity in the cranial structure and sometimes with no laceration or contusion of the scalp. Concussion of the brain, as a whole, may eventuate in a slow process of inflammation, softening or abscess and death some time after the injury and when to all appearance the patient had seemingly recovered. I have a case now under observation who received a severe concussion, remaining unconscious for several days, but finally slowly recovering save a little unsteadiness of gait and excitability of manner. He was at first paralyzed in some of the muscles of the right side. No mark or contusion on the head or any part of the body.

The symptoms of pressure are induced by the effusion of the blood between the dura mater and skull as in this case, and which was fluid and not a clot, and the pressure symptoms were of a most severe and profound nature, hemiplegia of one side and partial of the other side, stertor, coma, depression and partial arrest of most of the vital functions, inability to swallow and many others, making up an entire aggregate of symptoms which threatened the life of the person.

Again, a rupture of a larger or smaller trunk or branch of the middle, meningeal or cerebral arteries would produce sudden and great compression and possible death, and yet there has been no fracture or injury external, but as in this case profound disturbance of all the nervous and vascular areas. What shall be done with such cases? Formerly they were bled, purged, blistered and tortured by an experimental medication till the patient was dead, or, with a vital force which would not succumb to the injury, aided by the bombardment of remedies got well in spite of disease and the doctors. The evidence of compression of cortical centers may be determined with some degree of certainty by a comparison of symptoms contrasted as here stated. I quote from the "Encylopedic Index of Surgery:"

CONCUSSION.	COMPRESSION.
1. Insensibility more or less complete.	1. Total insensibility.
2. Respiration feeble.	2. Respiration stertorous, slow, puffy.
3. Pulse weak, irregular and frequent.	3. Pulse slow, full, labored.
4. Special senses dull.	
5. Pupils variable and sensitive to light.	5. Pupils widely dilated or one dilated and the other contracted.
6. Nausea as recovery goes on.	6. Stomach insensitive.
7. Bowels relaxed, sphincters not paralyzed.	7. Sphincters paralyzed and bowels torpid.
8. Bladder can expel the contents.	8. Bladder paralyzed.
9. Comes on instantly, but passes off slowly.	9. Does not appear at first but grows worse.

The two conditions usually coëxist, but the compression is found to exist and hence concussion may pass into compression as the latter term means pressure, and paralysis is usually taken as a distinguishing mark—a diagnostic sign of compression. The cause of compression is here in such cases with no fracture a hemorrhage, and we should know where it is most likely to occur and the fact of compression make us cast about to determine the location of hemorrhage. If it is an injury done to the medulla, cerebral artery or its branches we can determine readily enough from the nature of the injury, as blood may be deposited between the cranium and dura mater, or if the latter is broken or injured, or if not so, sooner or later we have compression of the cortex and also we have pressure upon the ventricles and cerebro-spinal fluid and thus a general disturbance by pressure which must be relieved if possible. These conditions imply extravasation of blood within the cranium, contusion or laceration and these conditions are found upon the surface of the dura mater. In the cavity of the arachnoid, on the brain surface in the substance of the brain as by foci, or in the ventricles, especially the lateral and at the lenticular

nucleus. It may occur in the corpus striatum, thalamus opticus, and if in the cortical structure near the surface may, as the blood continues, force its way through the cerebral matter, uplift the pia mater or find its way into the cavity of the arachnoid. The most common location of hemorrhage is the corpus striatum and thalamus opticus in apoplexy, or from disease of vessels, and rarely in the white structure, viz., corpus callosum. Large amounts of blood will occasion tumefaction and softening of the cerebral mass and flattening of the convolutions of the hemisphere which is the seat of lesion; before an examination may be made it is suspected. Hence a rule of action now is to trephine promptly so that these graver lesions shall not have time to occur, as well as to remove the primary cause of trouble, the blood, whether it be a clot or fluid as pressure exists, and the patient has no power of continuance unless relief can be offered by a removal.

I shall not attempt to follow the blood and tissue changes as it would not be competent, but only to indicate the procedure and the promptness with which it should be done. The surgeon who fails to offer his patient the relief which such a procedure as trephining and removal of so much of cranial bone as may give relief to the pressure, and removal of the clot and fluid *débris* to the great relief of the existing pressure upon the brain, either has not comprehended what it is to take in the situation by a summary, or is too temporizing to be a safe surgeon. Suffice it to say that this case was operated upon Feb. 21, 1893, and is now and has been for a year or more walking around our streets in the transaction of his business, and while he does not walk as steadily as I do, yet he is far better than a dead man and gives promise by improvement that he may yet recover fully, due to the prompt use of the trephine or chisel in removal of blood pressure.

The Technique of the Operation.—The method to be pursued in microcephalus and in any condition of the brain requiring an operation is that it shall be done as quickly as possible to give sure and prompt relief to the compressed organ. In cases of injury without fracture but with sufficient evidence to require an operation to be made, the surgeon should resort to one of several methods in exposing the bone and dealing with the scalp. It may be a long U or rather a horse-shoe flap which has been preceded by a running stitch around the region of the flap beyond it, so as to control the bleeding from the scalp. The horse-shoe flap perhaps is preferable, yet if by any preference of education or otherwise, he may resort to the crucial incision, and expose the bone. The trephine may be used in one or more places, and then by cutting forceps cut away the interfering structure so as to gain room and relieve pressure. This should be done, cutting as much or as little as the special case in hand may demand.

It may be found in compression by blood or clot that the blood is found beneath the dura mater or external to it. Then the incision of the dura mater may require to be done to reach the blood, or if there is evidence that there is blood or pus beneath the surface of the dura or pia mater or within the arachnoid spaces, the pressure should be relieved. It may be difficult to determine some cases, yet ordinarily the diagnosis can be made and the operation should follow. In fact, I hold that it is imperatively demanded of the surgeon in the face of unconsciousness or coma, with paralysis of one or both sides of the body, a slow and labored pulse and more or less difficulty of respiration, relaxation of the sphincters of the body, etc., to operate, and expect beside to benefit and probably save his patient. The technique should be great cleanliness and antiseptic precautions with as much protection to all the delicate structures as may be possible. Antiseptic gauze, iodoform, boracic acid solution (1 to 25 to 50) bichlorid mercury solution (1 to 3000 to 5000) or more, light bandage and compress after parts are externally adjusted. The patient may not be able to take anything until consciousness returns, then light unstimulating diet, quiet and rest in a room well ventilated at temperature of 70 degrees.

Conditions.—As a summary of propositions in such cases:

1. Cases of coma by compression, as distinguished from coma by irritation, which may be reflex or direct. We must decide a case, as one of compression, by some intercranial cause before an operation is surgically admissible.

2. That coma from reflex conditions and affecting vssels, and producing coma by irritation, or coma by contraction of vessels, and as a result vascular anemia, must be distinguished from the former.

3. There shall be no fracture in the cases herein considered.

4. We may have concussion and final compression of brain from rupture of vessels, accumulation of blood and pressure symptoms.

5. Given such conditions, what surgical procedure is required if any (except in second proposition), but found in first, second, third and fourth propositions.

Answer to these propositions: Operation—by necessity—except in proposition 2.

THE SURGICAL TREATMENT OF INJURIES OF THE HEAD.

BY CHARLES B. PARKER, M.D., M.R.C.S., ENG.
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The treatment of head injuries is a subject of general interest. Such injuries occur in the practice of every medical man. With the exception of such general remedies as rest, ice, cathartics and sedatives their treatment is necessarily surgical, and when successfully carried out furnish a good test of the mastery of the technique of aseptic and antiseptic methods.

No injury of the head can be considered trivial, for the simplest one may lead to fatal consequences. The cause of this results anatomically from the well-known close structural connection between the coverings and contents of the brain, and pathologically, in the fact of direct or embolic germ infection. Anatomically we have a rather thin skin connected to the aponeurosis of the occipito-frontalis muscle by a very dense cellular structure, the fibers of which have something of a ligamentous strength and inclose a peculiarly vascular adipose tissue with which the vessel's walls are intimately connected. The bone is not solid—an outer tough and an inner brittle table, and between, the vascular diploë; beneath these the dura mater. You know how intimately the dura is attached to the inner surface of the calvarium if you have ever attempted to remove it post-mortem. The dura mater is more dense than pericranium or periosteum; it is a fibro-serous membrane. You know

how delicate such membranes are, how easily injured and how easily inflamed. By this intimate structural and continuous vascular arrangement, the force of a blow directed at or nearly at right angles to a given surface of the head may be transmitted directly to this serous membrane, producing hemorrhage, with subsequent pressure and inflammatory symptoms. There is at least one anatomic provision to offset this, provided in the mobility of the scalp upon the pericranium, by which a force impinging upon the head at a tangent becomes a glancing blow and its full force is not transmitted to the brain.

Pathologically the rich vascular and lymphatic circulation supplied through the scalp, pericranium, diploë and dura offers a direct and complete highway for the entrance of infecting germs. When no wound can be made out we must regard the appearance of suppuration following head injuries as due to embolic infection.

We are, perhaps, all ready to acknowledge (from experience) that true acute suppurative inflammation and abscess formation is always the result of the action of germs, and that such inflammation does follow external injury to the skull, and yet at the same time we may be unable to fully appreciate the minute mechanism of its production and utterly unable to demonstrate the path pursued by the morbific agents, even when the inflamed territory or collection of pus is but an inch below and directly beneath the external scar. All this serves to show that it is often difficult and even impossible to predict the extent of the damage and the subsequent danger from the local manifestations of the injury. The symptoms alone are not sufficient. The former closely drawn differential signs between concussion and compression, are found untrustworthy, and we have learned that the question of infection or non-infection is a much more important one. But as a fracture opens up a possibly direct channel of infection, and at the same time may exert a disastrous pressure on the brain, its diagnosis becomes of prime importance. In certain extensive fractures with depression the diagnosis is easy. But in other cases again most difficult:

1. In cases without external wound. It was, I believe, the shrewd Irish surgeon, Abraham Colles, who said a fracture with a depression *always carries the scalp with it*, and that this furnishes the basis for a differential diagnosis between mere contusion of the scalp and fracture of the skull. This is the way he states it: "Run your finger along the scalp towards the tumor, and before it gets to its soft yielding center, your finger will have to raise over a ridge around its margin and then it will suddenly sink, which will not occur if it is really a depression in the bone. . . . If the bone is really depressed, you will find that the scalp is depressed along with it and there will be no tumor at all, and on running your finger over the place where you feel the depression in the scalp your finger will sink *gradually* into the depression." This observation will serve most useful purpose especially on the frontal and parietal bones, but in depressed fractures, otherwise located, cannot always be made out. Where any doubt exists in such a case, I believe it is proper for the surgeon to make an incision, observing all aseptic precautions, and thus determine beyond the shadow of a doubt the question of fracture or no fracture. I have never in but one case made this incision under such circumstances and found no fracture, and in that case the only effect of the incision was to hasten the recovery by evacuating the bloody serous effusion, thus relieving the tension and promoting the healing.

2. In injury of the head, with wound, we also find great difficulty occasionally in determining absolutely the presence or absence of fracture. No one now uses the probe in such cases, as it is next to useless and may be dangerous. If any exploration through the wound is desirable after its thorough disinfection, the surgically clean finger can be used. But even then the fracture may be so placed that it can not be detected, as the following case in briefl illustrates:

Tommie K., aged 11, was admitted to the Lakeside Hospital, having been struck on the back of the head by a passing freight train. There was a small punctured and lacerated wound just below and in a line with the inion. This was cleansed and carefully examined by the little finger but no fracture or even bare bone could be reached. Patient conscious, pupils dilated, pulse 40, respiration 12. Evidently there was some pressure or serious disturbance at base of the brain. Patient was anesthetized and a sharply curved incision carried out on either side from point of punctured wound for one and three-quarter inches. At the very base of this flap we came upon a V-shaped depressed fracture, base looking up and point buried in the membranes of the base of the brain. The moment the point was elevated the pulse jumped to 94 and the respiration to 26. In this case no suspicion of the fracture could be gained from any examination of the wound itself.

There is another reason why enlarging the wound by incision is useful, and that is the thorough cleansing of the wound. Dirt, hair and other impurities are often carried by the force of the blow beyond the touch or view. I make it an almost universal rule to enlarge the incision, especially in the smaller and punctured wounds of the scalp, and am nearly always rewarded by finding some dirt which could not otherwise be reached, and occasionally a fracture which had not been suspected. This little procedure rarely requires an anesthetic, as the parts are already bruised and numbed.

In compound depressed fractures of the skull, proceeding as above outlined, I am in the habit of using the chisel rather than the trephine to effect the elevation of the depressed bone. With the chisel it is often only necessary to remove a narrow overhanging shelf of bone from the outer table, or to cut through the serrated edge where the depressed bone bends away from the uninjured portion of the skull. The objection that the blows of the hammer add to the already existing concussion does not hold good, for with a properly constructed chisel with a sharply concave or sharp V-shaped cutting edge and a thick handle, such as is found in a shoemaker's awl, the operation may be made entirely by the hand. The chisel saves so much bone, may be operated so much more quickly, and it is next to impossible, unless grossly careless, to injure the dura mater. I have spoken of saving the bone fragments. The following case, in brief, will illustrate my practice:

A little fellow, 5 years of age, while playing, fell from a box car and struck on the iron drawbar of a switch. When he reached the hospital considerable brain matter was found matted in his hair. The whole right side of his head was smashed and flattened, and a fracture extending into the frontal bone in front to the occipital bone behind. He was conscious and promised to be a good boy if I would let him sit up and look out on the lake. He was anesthetized, a large flap raised and the extensive depression exposed. There was a large central oval piece of bone its greatest diameter, perhaps, a little less than three inches, its lesser a little more than two inches and surrounded by a number of small, irregular depressed pieces. By means of a chisel

these smaller fragments were loosened and removed. The large central fragment immediately came into position. It was perfectly loose and bare of both pericranium and dura, and a severe hemorrhage from the middle meningeal and some of the large branches of the middle cerebral occurred. The fragment of bone was raised and a long strip of iodoform gauze packed over the bleeding surface, the end of the gauze being left out at the lower margin of incision for drainage, and the piece of bone returned to its place. Gauze drainage removed at end of thirty-six hours. Wound was re-dressed on fifth day and again on the tenth. At first dressing the fragment of bone showed very white through the bruised wound, but at second dressing it was completely covered by granulations, and recovery took place with some paralysis of motion in the left side.

This is not the only experience I have had in leaving the larger fragments of a depressed fracture in place, and thus far have had no occasion in depressed fractures to insert a sheet of sterilized gold foil or platinum plates to prevent cerebral hernia. I can readily see that it might be of advantage after trephining, especially for epilepsy, to insert some non-irritating substance in the buttonhole to prevent any union between the dura and pericranium. But in nearly every case in which some such method has been attempted, so far as I can learn, though for the time being successful, sooner or later suppuration has occurred with sinus formation which necessitated the removal of the foreign substance.

As a preventive against cerebral hernia, I believe nothing to be of such value as an aseptic wound, and when infectious suppuration has taken place nothing will certainly avert this most distressing and most fatal complication of head injuries.

We may sum up our conclusions as follows:

1. In any case of doubt as to the character of a head injury, to explore by incision if necessary.

2 In the case of wounds, especially the smaller and punctured, to enlarge them for exploration and cleansing.

3. In all cases of fracture, depressed or fissured, to operate, elevating the depression and exploring the fissure for a depression of the inner table, which so often does occur.

4. To leave principal fragments of bone after elevation, if surgically clean, even if entirely detached from the dura mater and pericranium, thus averting cerebral hernia, vertigo and other cerebral disturbances.

5. That all these operative measures should be conducted under the most rigid aseptic and antiseptic measures.

THE SANITARY CARE OF SMALLPOX AT COOK COUNTY HOSPITAL DURING THE LATE EPIDEMIC.

Read before the Public Health Section of the Chicago Civic Federation.

BY RICHARD BARTLETT OLESON, M.D.
CHICAGO.

Theoretically, smallpox is not treated at the County Hospital. But during the epidemic which existed last winter it became necessary, as a matter of humanity, to provide for the 400 victims of the disease who sought medical aid there. From a sanitary point of view, these were easily separated into two classes; those who only required a place of shelter until they could be sent to the smallpox hospital, and those who were too sick to be moved, needing nursing and medical care.

Early in the epidemic it became very evident that the facilities at the disposal of the City Board of Health for handling smallpox patients were, to put it mildly, extremely inadequate. As soon as we began to receive patients in any great number we saw that it would be impossible for us to depend on the chance of getting a smallpox ambulance to take them to the special hospital, and so, through the courtesy of the Warden and the Hospital Committee of the County Board, one of the County Hospital ambulances was diverted from its legitimate work and set to conveying smallpox patients from the County Hospital to the pest house. As soon as we got enough patients we made up a load and sent them on. So the ambulance trips were irregular. One patient would simply step into the wagon at once; another might be kept for forty-eight hours. Hence you will see that the hygienic care of the different patients varied greatly.

The way in which we handled an ordinary uncomplicated case that we intended to keep for some time was as follows: All persons seeking admission to the hospital must pass the doorkeepers who soon became quite expert in detaining suspicious cases. At such times the examining physician was at once called, and if he pronounced the case to be variola the man did not enter the hospital building proper, but was taken by an orderly around to the entrance of the contagious disease ward, which can only be reached from the outside. The ward itself is on the fourth floor of the new pavilion and is entirely isolated from the rest of the hospital. In this ward, which is made up of detached rooms, a large apartment with its own special closets and toilet rooms was set apart for the reception of these cases, and here a male nurse dwelt constantly.

Upon admission, patients were given an ordinary scrub bath with soap and water and put to bed, upon a new clean mattress with new bedding, unless they were merely to wait for the ambulance and it was reasonably certain that this would depart soon. In this case, nothing whatever was done to them. The clothes of the bed patients were placed in a corner of the room until they could be fumigated. If it became possible to send a patient to the pest house before fumigation began, he went in his own clothes; otherwise a new suit of hospital clothes was given him. Then he was put into the ambulance, with a certificate from the house physician to the effect that he was a proper case for the smallpox hospital. Then, if he had occupied a bed, the bedding was taken by a special porter out into the large open lot behind the contagious disease ward, and there burned; and we considered our connection with that particular case to be ended.

Owing to the fact, as at first stated, that the hospital did not intend to care for variolous patients, there was no modern fumigating furnace. We improvised a substitute by placing the clothes in a small windowless closet containing a steam coil. The end plug of that coil was taken out, and an iron kettle of one gallon capacity, placed on bricks to elevate it from the floor, was filled with brimstone and alcohol, and the alcohol fired. Then we shut the door, pasted up all the chinks and crannies, turned on the steam from outside and left it for two days. Then we turned off the steam and as soon as we thought the room was cool enough we opened it, raked out the clothes, and put them in a clean closet to await orders.

When a patient who had passed through the disease in the ward completely recovered (and we considered

this point to have been reached when none of the pustular eschars could be found on him), he was given a thorough tub bath in a small bath room just off the ward, ordinary soap and water being used. The tub was then cleaned and the patient bathed in a 1 to 1000 solution of bichlorid, after which a third bath of clear water without soap was given. Then the sites of the eruption were sponged with alcohol (care being taken to protect the eyes) and he was wrapped in a clean old sheet, in which he walked out of the ward to another room. Here the sheet was discarded, his fumigated clothes given him and he was allowed to go free. Then all his bedding, with the last clean sheet just mentioned, was burned, and his bed fitted up fresh for the next case.

Many of the seriously ill died in the ward. When this occurred their bodies were wrapped in a winding sheet soaked in 5 per cent. carbolic solution (the body having first been bathed in the same solution), and a second sheet saturated with 1 to 500 bichlorid placed outside the first. Then the body was placed in a pine coffin, this in a zinc-lined box, the top close fitting, was screwed down tight and the body sent to the cemetery. All his belongings not of value were then burned. Coins, chains, etc., were boiled.

No attending physician visited the smallpox ward. The house physician (who, by a somewhat unfortunate arrangement, had at the same time to attend the measles, diphtheria, scarlet fever and erysipelas wards) on entering the ward assumed a jacket and apron over a special suit of clothes. On leaving, he doffed the jacket and apron, removed his outer garments, and then sterilized his hands before donning the clothes he wore in the other wards.

In conclusion, the writer wishes to take this opportunity of stating that the then Warden of the County Hospital, Mr. W. T. Monroe, deserves the sincere thanks of every citizen of Cook County for the prompt and efficient aid he lent to every effort made for the stamping out of the pest. The house staff put redoubled zeal into their work with the knowledge that the Warden could be depended upon to back them in all their undertakings.

ORIGINAL INVESTIGATIONS ON THE NATURAL HISTORY, (SYMPTOMS AND PATHOLOGY) OF YELLOW FEVER. 1854–1894.

BY JOSEPH JONES, M.D., LL.D.
NEW ORLEANS, LA.

(*Continued from page 204.*)

CHAPTER IV.

CASES OF YELLOW FEVER, OBSERVED 1873, BY DR. TAYLOR, M.D., OF NEW ORLEANS.

Date. 1873	Pulse. M.	Pulse. E.	Resp. M.	Resp. E.	Temp. Cent. M.	Temp. Cent. E.
Aug. 17	112	124	....	....	.....	40.2°
" 18	118	104	....	....	39.2°	38.6°
" 19	104	104	....	....	36.6°	39 °
" 20	106	116	....	....	39.2°	40.2°
" 21	108	100	....	....	39 °	39.8°
" 22	108	120	....	....	39.8°	40.2°
" 23	108	128	....	....	39.4°	40.4°
" 24	120	136	....	....	.....	.....
" 25	132	128	....	....	.....	.....
" 26	124	128	....	....	.....	.....
" 27	120	116	....	....	.....	.....
" 28	110	112	....	....	.....	.....
" 29	96	88	....	....	.....	.....
" 30	84	76	....	....	.....	.....
" 31	66	56	....	....	.....	.....
Sept. 1	48	40	....	....	.....	.....

HISTORY OF CASE. REMARKS.

Jas. Crawford, aged 8 years, taken ill Aug. 16. Saw him for first time on evening of Aug. 16. Crawford children had arrived from Ireland only three months previously. In this case, as soon as remission and exacerbation began to be distinctly marked (say from about the seventh day), I began using quinia in gr. xx doses in 24 hours. The remission and exacerbation evidently were not affected by the drug for several days, and then variations continued for some time after Aug. 23, when, owing to an accident, I was compelled to suspend the use of the thermometer. I gave quinin from the morning of the twelfth day. The condition of the stomach remained good nearly all the time. I gave beef tea and milk several times each day. In this, although the symptoms and appearance of the patient pointed strongly to yellow fever, and although the urine contained albumen, still the indications afforded by the pulse and thermometer caused hesitation. Quinia, however, although freely used, did not bring about any solution to my doubts, and I finally suspended its use. The fever really seemed to decrease after the twelfth day, and the minimum of pulsations (40) was reached only at the close of the eighteenth day. For several days during the height of the disease I was considerably annoyed by a free discharge of blood from the gums, which was at last checked by the internal use of the perchlorid of iron. Convalescence was tedious, owing to the great debility of the child, who suffered from several carbuncles attended by sloughing.

Date. 1873	Pulse. M.	Pulse. E.	Resp. M.	Resp. E.	Temp. M.	Temp. E.
Sept. 20	120	112	....	....	.....	.....
" 21	108	92	....	....	.....	104.6°
Night	..	92	....	....	.....	103.6°
" 22	96	112	....	....	.....	.....
Night	....	120	....	....	.....	.....

REMARKS.

Father Schneider; taken ill September 20, about 2 P.M.; died on September 23, at 9 A.M. Black vomit. Had spent two years in St. Thomas; came to New Orleans March, 1870. Immediately after his death the bed and bedding and his clothes were burnt; the room and house disinfected a few hours later by the board of health.

Joseph Fitzpatrick, aged 6 years; taken sick September 21. Had spent more than one summer in the city. Recovered. September 21, pulse, morning, 156, evening, 148; Sept. 22, morning, 128, evening, 120; Sept. 23, morning, 108, evening, 104.

Date. 1870	Pulse. M.	Pulse. E.	Resp. M.	Resp. E.	Temp. Cent. M.	Temp. Cent. E.	REMARKS.
Sept. 8	104	96	20	24	40 °	40.8°	Luce Maxime; taken with fever September 6, 1870. Paid first visit on September 7, 1870. No trace of albumen in urine which was freely excreted during the whole attack; recovered.
" 9	88	88	20	20	40.6°	41 °	
" 10	80	76	32	24	40.2°	40.2°	
" 11	64	60	24	20	39.4°	39.6°	
" 12	60	64	20	20	38.6°	38.8°	
" 13	60	56	20	20	38 °	37.8°	
" 14	52	52	20	20	37.6°	37.6°	
" 15	52	48	20	20	37.6°	37.6°	
" 16	41	56	20	20	37.8°	38 °	
" 17	66	64	20	24	38 °	38 °	
" 18	50	64	20	20	37.8°	37.6°	
" 19	56	48	20	24	37.8°	38 °	
" 20	64	68	24	20	38 °	38.2°	

Date. 1870	Pulse. M.	Pulse. E.	Resp. M.	Resp. E.	Temp. Cent. M.	Temp. Cent. E.	REMARKS.
Sep. 28	116	116	. .	. .	C.	C.	M. T. Bugman; age 22 years; recently arrived from Kentucky; laborer; taken ill September 27, 1870; first visit made September 28. Jaundice and suspicious character of vomit noted on 29th; great quantity of black vomit on September 30 and October 1. Died in convulsions at 3 P.M. October 1.
" 29	96	100	. .	. .	40.4°	41.2°	
" 30	92	92	. .	. .	40.4°	41.2°	
Oct. 1	100	. .	. .	. .	38.8°	40 °	

Date. 1870	Pulse. M.	Pulse. E.	Resp. M.	Resp. E.	Temp. Cent. M.	Temp. Cent. E.	REMARKS.
Sep. 29	72	72	. .	. .	38.6°	38.6°	No diminution in quantity of urine; no albumen perceptible; recovered
" 30	68	68	. .	. .	38.8°	40 °	
" 31	68	68	. .	. .	38.2°	38.4°	
Oct. 1	72	68	. .	. .	38.4°	38.6°	
" 2	60	64	. .	. .	37.6°	37.8°	
" 3	54	54	. .	. .	37.4°	38 °	
" 4	50	54	. .	. .	37.6°	37.8°	
" 5	50	54	. .	. .	37 °	37.4°	
" 6	50	. .	. .	. .	37.4°	37.4°	
" 7	60	. .	. .	. .	. . .	. . .	

CHAPTER V.

POST-MORTEM TEMPERATURE IN YELLOW FEVER.

The medical profession is indebted to Dr. Bennet Dowler, of New Orleans, for the first, and up to the present time the most extensive, observations illustrating the temperature of various portions of the body after death from yellow fever.

The results of the researches of Dr. Dowler were

originally transmitted to the *Western Journal of Medicine and Surgery*. during the winter of 1843-44, but were returned to the author unpublished. The original data were published sixteen years later by Dr. Dowler in the *New Orleans Medical and Surgical Journal*, March, 1860, Vol. XVII, No. 2, pp. 199–220, and from this paper I have consolidated the following tables, which will illustrate the state of our knowledge with reference to the post-mortem temperature in yellow fever:

Temperature of the primary period of those who died of yellow fever.

Hours Sick.	Hand.	Axilla.	Observations.
12	102°	105°	
12	103°	107°	
12½	105°	105°	Died in seven days.
24	104°	107°	Died in four days.
28	107°	107°	
15	. . . . .	102°	
37	97°	102°	
26	104°	109°	
29	107°	109°	
34	103°	104°	
42	97°	102°	
24	99°	100°	Died in two days.
24.6	102.5	104.9	

Temperature of middle period of those who died of yellow fever.

Hours Sick.	Hand.	Axilla.	Observations.
1	99.5°	104 °	
5	101 °	104 °	
5	97 °	102 °	
3½	100 °	105 °	
3½	100 °	105 °	Died in three days.
2	100 °	102 °	Died in four days.
4	104 °	107 °	Died in three days.
3	100 °	104 °	Died in three days.
4	102 °	105 °	
5	91 °	102 °	
6	100 °	105 °	
6	102 °	105 °	A relapse.
7	98 °	100 °	Died in four days.
8	93 °	99 °	Died in three days.
5	99 °	104 °	
8	102 °	102 °	
12	106½°	105 °	
1	99 °	100 °	
6	100 °	104 °	Died in two days.
7	91 °	102 °	Died in three days.
7	101 °	104 °	
8	102 °	102 °	
12	105 °	106½°	
14	101½°	108 °	Died in three days.
6	99 °	. . . . .	Died in three days.
6.4	99.4	103.39	

Temperature in the primary period of yellow fever in persons who recovered.

Age.	Hours Sick.	Hand.	Axilla.	Observations.
29	3½	102°	106 °	V. s. ad del.; cured in six days.
28	20	102	105	V. s. ad del.; well in six days.
24	8	101	103	V. s. ad del.; well in seven days.
30	9	100	106½	Cured in thirty-eight days.
. . .	5	102	104	Intermittent type; well in eight days.
30	12	105	105	V. s. ad del.; cured in six days.
35	13	102	104	Cured in seven days.
24	14	102	104	Cured in ten days.
27	13½	102	104	Cured in twenty days.
21	16	107	107	Cured in seven days.
28	19	102	104	Cured in three days.
29	22	102	104	V. s. ad del.; well in four days.
25	28	102	106	Cured in nine days.
28	26½	102	104	V. s. ad del.; cured in fourteen days.
41	48	99	102	
30	48	98	104	V. s. ad del.; cured in one day.
22	48	104	106	
21	48	. . .	102	Ninth day convalescent.
28	48	97	103	Ninth day cured.
26	48	105	. . . .	Cured in ten days.
29	48	97	102	Cured in six days.
23	60	. . .	103	Cured in seven days.
34	24	99	102	
31	14	95	102	Cured in twenty days.
25.5	26.8	101.2°	104.1°	

Temperature in the fatal stage of yellow fever, with some account of the respiratory action.

Hours before Death.	Hand.	Axilla.	Respiration.
10	101 °	102 °	Respiration quick and uneasy.
24	95	104	Respiration quick.
8	. . . .	101	Coma; seven respirations per minute.
1	91	100	Respiration tired, heaving.
1½	94	100	Respiration noisy, quick, laborious.
6	89	100	Respiration noisy, slow.
2¼	70	95	
9	94	100	Respiration imperfect, quick, irregular.
21¼	95	100	Respiration noisy.
21½	104	106	Respiration irregular.
11½	81	90	
11	88	100	Respiration quick, wheezing; coma.
10	84	95	Respiration easy.
7½	86	97	Respiration laborious, irregular.
12	95	102	Stertor; coma.
11	89	95	Respiration quick and irregular.
12	. . . .	99	Respiration noisy, quick and laborious.
6	83	. . . .	Respiration imperfect, small, irregular, quiet.
7	81	90	Respiration extremely laborious, gasping.
26½	104	105	Coma; stertor.
24	. . . .	100	Respiration hurried; coma.
21½	97	104	Coma; stertor.
23	89	98	Respiration quick.
1	84	95	Respiration slow; loud heaving.
67½	101½	103	Respiration imperfect.
5¼	100	101	Respiration quick and irregular.
12	102	102	Respiration quick.
40	. . . .	97	Respiration quick.
24	89	100	Respiration loud, laborious, rattling; coma.
1	. . . .	102	Respiration loud, puffing.
2	. . . .	100	Respiration loud, quick; coma.
48	88½	97½	Respiration quiet, puerile.
2½	89	99	Respiration stertorous; coma.
24	93	97	Respiration hurried, unequal.
28	102	104	Respiration easy.
72	88	101	Respiration quick, very easy.
5	. . . .	95	Respiration rapid, small.
9	. . . .	98	Respiration hurried, suffocative.
4½	89	97	Respiration easy.
24	91	101	Respiration imperfect; nineteen per minute.
24	88½	102	Respiration wheezing, puffing; rattling cough.
2	93	97	Respiration irregular, laborious, quick.
24	66	95	Respiration quick, puerile.
12	98	101	Respiration quick, puerile, loud.
12	. . . .	100	Respiration hurried.
30	104	106½	Respiration hurried.
4	102	104	
6	. . . .	96	Respiration slow, imperfect.
12	100	101	Respiration fifty-seven; coma.
24	100	103	Respiration stertorous; comatose.
5	89	100	Respiration noisy, slow.
16.6	92.2	99.5	

Temperature of the middle period of yellow fever of those who recovered.

Age.	Days Sick.	Hand.	Axilla.	Observations.
30	6	106 °	108.2°	Third day convalescent.
27	2	102	105	
30	1½	99	105	
. . . .	2½	102	102	
29	2	100	102	Cured in three days.
34	4	102	104	Cured in ten days.
. . . .	5	. . . .	102	
21	2	97	103	Cured in nine days.
26	6	97½	100	Cured in five days.
24	14	100	104	
. . . .	16	106	106	
24	3	97	102	Cured in thirty days.
29	5	102	109	Cured in twelve days.
38	4	100	102	Cured in two days.
23	4	100	104	Cured in fifteen days.
19	16	104	104	Cured in five days.
38	4	104	104	Cured in nine days.
38	12	95	102	Cured in fifty days.
27	4	99	104	Cured in four days.
22	9	103	104	Cured in twenty-eight days.
34	5	99	100	Cured in six days.
20	4	97	100	Cured in five days.
32	7	100	103	Cured in ten days.
24	5	99	100	Cured in six days.
32	6	100	102	Cured in six days.
22	3	100	103	
22	4	100	104	Cured in four days.
20	4	100	107	Cured in four days.
25	6	107	107	Cured in eight days.
28	6	102	102	Cured in seven days.
30	8	101	102	Cured in five days.
18	7	102	104	
21	9	101	102	Cured in sixteen days.
23	. . . .	97	101	Cured in twelve days.
27	4	104	108	Cured in seven days.
35	12	91	102	
22	7	93	100	Cured in six days.
18	11	102	102	Cured in four days.
24	9	94	97	Cured in ten days.
41	2	99	102	
26.9	5.9	100.4	103.1	

Temperature of the period of convalescence in yellow fever.

Days Sick.	Hand.	Axilla.	Days Sick.	Hand.	Axilla.
2	100 °	99 °	5	. . . . .	95
5	96	100	16	97	98
3	100	102	10	100	100
4	93	99	18	95	98
5	91	97	8	. . . . .	102
4½	99	98	7	97½	101
2½	86	97½	8	99	101
1½	97	100	1	98½	102
9	. . . . .	97	. . . . .	100	102
7	97½	83	2	98	100
9	94	100	5	95	99
6	95	99			
8	96	99	6.5	96 °	98.46°
9	93	95			

Post-mortem series, showing the post-mortem heat of regions. Death caused by yellow fever.

Time dead when observations began. H	M	Time observations lasted. H	M	Air.	Axilla.	Thigh.	Rectum.	Perineum.	Pelvis and Abdomen.	Liver.	Epigastrium.	Chest.	Heart.	Brain.
	10	4	8	90½	109 °	113 °	. . .	. . .	. . .	112 °	111 °	. . .	109 °	. . .
	5	2	.	89	107	107	105 °	. . .	106 °	106	105	106 °	104	. . .
	30	.	33	88	104	. . .	112	102 °	. . .	. . .	103	. . .	. . .	102 °
	15	1	5	79	102	102	104	. . .	. . .	. . .	101	100	100	. . .
	5	.	31	70	106	102	. . .	. . .	. . .	. . .	106	. . .	. . .	101
	10	1	.	71	96	98	. . .	. . .	. . .	. . .	90	97½	. . .	93
	50	1	.	82	103	102	. . .	. . .	. . .	. . .	104	. . .	. . .	100
3	. .	2	.	80	101	100	100	. . .	. . .	102	101	. . .	. . .	95
1	. .	1	9	82	103	104	. . .	. . .	. . .	108	104	97	. . .	99
	10	1	51	80	106	108	. . .	. . .	. . .	. . .	106	. . .	. . .	101
	10	2	20	84	106	107	. . .	. . .	. . .	. . .	109	. . .	. . .	. . .
3	. .	.	51	85	106	105	. . .	. . .	. . .	. . .	109	107	. . .	. . .
2	. .	2	.	80	102	103	. . .	. . .	. . .	. . .	104	103	. . .	. . .
	20	1	40	90	106	106½	. . .	104	. . .	. . .	106	105	. . .	. . .
	30	.	45	86	103	100	. . .	. . .	. . .	. . .	105	. . .	. . .	. . .
3	. .	.	10	82	106	. . .	105	. . .	. . .	. . .	. . .	. . .	. . .	. . .
1	. .	2	.	84	106	106	. . .	. . .	. . .	. . .	106	106	. . .	. . .
	33	.	33	90	108	. . .	. . .	106	. . .	. . .	. . .	. . .	. . .	. . .
2	. .	1	41	91	. . .	103	102	. . .	. . .	. . .	104	101	. . .	. . .
	5	1	8	86	104	108	104	. . .	. . .	. . .	106	103	. . .	. . .
	15	1	45	88	104	106	. . .	. . .	. . .	. . .	109	. . .	106	. . .
	15	2	.	89	104	106	109	. . .	. . .	. . .	108	104	103	. . .
1	30	.	20	82	104	. . .	104	. . .	. . .	. . .	. . .	. . .	. . .	. . .
	15	1	45	82	102	104	101	. . .	102	105	104	102	99	. . .
	20	3	20	83	108	109	. . .	104	107	104	109	104	. . .	. . .
2	. .	1	30	80	105	. . .	104	. . .	. . .	. . .	105	. . .	. . .	. . .
2	30	3	50	86	109	. . .	107	109	107	107	105	102	102	. . .
	30	1	4	83	107	108	. . .	. . .	106	. . .	109	102	102	. . .
	30	1	40	87	105	. . .	104	104	107	. . .	. . .	. . .	. . .	. . .
	1	4	.	90	103	102	. . .	102	104	104	104	105	105	. . .
	30	4	.	90	106½	. . .	111	109	. . .	. . .	. . .	. . .	. . .	. . .
1	. .	3	.	89	103	. . .	102	104	. . .	. . .	. . .	. . .	. . .	. . .
	15	4	45	86	107	109	. . .	104	106½	109	108	106½	106½	. . .
	15	1	.	82	102	100	. . .	. . .	. . .	. . .	102	. . .	. . .	. . .
	16	2	.	84	104	103	107	. . .	. . .	. . .	110	. . .	. . .	. . .
	10	.	.	85	107	107	. . .	. . .	. . .	. . .	107	104	. . .	. . .
	10	.	26	85	103	104	. . .	. . .	. . .	. . .	. . .	102	. . .	. . .
	5	.	17	75	107	107	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
	30	.	20	87	100	. . .	. . .	. . .	100	. . .	. . .	102	. . .	. . .
2	. .	.	35	84	100	. . .	98	. . .	. . .	. . .	. . .	. . .	. . .	. . .
	25	.	55	85	103	. . .	102	101	. . .	. . .	. . .	. . .	. . .	. . .
	5	.	12	90	106	. . .	106	. . .	. . .	. . .	. . .	. . .	. . .	. . .
	10	.	36	85	103	104	. . .	. . .	. . .	. . .	102	. . .	102	. . .
M	58½	8	32	84.4	104.44	104.44	104.05	104.95	105.05	106.33	105.48	102.95	103.5	98.71

Post-mortem series, showing the decline of post-mortem heat, the antagonism of the surrounding media or incipient regional refrigeration, the forerunner of putrefaction.

Time dead when observations began. H.	Min.	Duration of Experiment. H.	Min.	Air.	Epigastrium.	Lungs.	Heart.	Liver.	Rectum and Pelvis.	Thigh.	Axilla.	Brain.
3	20	. .	40	81 °	104 °	104 °	. . .	. . .	104 °	. . .	. . .	. . .
4	50	1	10	86	105	. . .	102 °	107 °	102	. . .	. . .	. . .
4	. . .	. .	15	82	100	93	. . .	. . .	. . .	99 °	. . .	. . .
10	. . .	. .	9	90	93	. . .	. . .	. . .	. . .	92	. . .	. . .
2	. . .	. .	10	84	106	. . .	. . .	. . .	. . .	103	. . .	. . .
3	. . .	. .	15	85	. . .	104	. . .	. . .	. . .	100	. . .	. . .
5	. . .	. .	28	66	93	. . .	. . .	. . .	. . .	88	88¼	86 °
4	30	. .	30	70	100	97	. . .	. . .	. . .	99	. . .	93
12	. . .	. .	55	79	92	91	91	. . .	91	89	. . .	84
11	. . .	. .	25	80	96	. . .	93	. . .	. . .	93	. . .	85
6	. . .	. .	8	91	102	. . .	. . .	. . .	. . .	100	. . .	. . .
3	. . .	. .	20	86	104	. . .	. . .	. . .	. . .	100	100	. . .
13	. . .	. .	10	80	95	. . .	. . .	. . .	. . .	93	. . .	. . .
6	. . .	. .	20	80	103	. . .	. . .	. . .	. . .	100	100	. . .
15	. . .	. .	30	86	92	91	. . .	. . .	. . .	87	. . .	. . .
10	. . .	. .	20	80	91	. . .	. . .	. . .	. . .	86	. . .	. . .
3	. . .	1	. . .	61	84	80	87	86	. .	84	. . .	. . .
6			27	86.29	97.5	94.28	93.25	96.5	99	94.26		

Post-mortem series, showing the coincidence of temperature between the dead body and the atmosphere at the period of incipient putrefaction.

Hours Dead.	Temp. of Room.	Epigast.	Lungs.	Brain.	Axilla.	Thigh.
16	87 °	89 °	89 °	. . . . .	. . . . .	89 °
23	90	92	92	. . . . .	. . . . .	88
14	80	83	84	78 °	. . . . .	81
19	86	89	89	. . . . .	. . . . .	86
13	88	95	. . . . .	. . . . .	. . . . .	93
27	86	86	. . . . .	. . . . .	. . . . .	82
20	91	91	. . . . .	. . . . .	. . . . .	91
16	71	. . . . .	. . . . .	74	. . . . .	88
10	90	93	. . . . .	. . . . .	. . . . .	92
15	90	93	. . . . .	. . . . .	. . . . .	88
15	86	92	91	. . . . .	. . . . .	87
19	88	91	. . . . .	. . . . .	. . . . .	88
18	88	90	. . . . .	. . . . .	. . . . .	88
22	90	90	. . . . .	. . . . .	. . . . .	. . . . .
12	70	. . . . .	. . . . .	. . . . .	86 °	. . . . .
6	91	. . . . .	. . . . .	. . . . .	91	. . . . .
24	54½	65¾	. . . . .	. . . . .	. . . . .	56¾
17¾	83	. . . . .	. . . . .	83	. . . . .	89
. . . . .	94	82	. . . . .	81½	82½	79
17.04	84.3°	88.1°	89°	79.12	86.5	85.35°

Post-mortem series, showing the comparative temperature taken at variable periods after death, in several regions of five different bodies, amounting to forty maxima.

Maxima of eight regions compared in five cadavers.

Thigh.	Epigas.	Axilla.	Chest.	Heart.	Brain.	Rectum.	Liver.
113 °	111 °	109 °	107 °	109 °	102 °	111 °	112 °
109	110	109	106½	106	101	109	109
109	109	108	106	105	101	107	108
108	109	108	106	104	100	107	107
108	109	107	105	104	99	109	106
M 109.4	109.6°	108.2°	106.1°	105.6°	100.6°	108 °	108.4°

(*To be continued.*)

NERVOUS DISEASE IN EARLY SYPHILIS.

Read before the Chicago Academy of Medicine, October, 1895.

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(*Continued from page 188.*)

Acute complicating diseases are not usually credited with the power of aggravating syphilis, but the fact none the less remains that general or local impairment of nutrition is likely to determine syphilitic action. The more prolonged and irritating the process, the better the prospect of an outcropping of the specific taint.

There is no disease perhaps, which more actively predisposes to nervous disturbance in syphilis than la grippe. I believe that I could, from my own experience, formulate quite a lengthy clinical paper on syphilo-grippal neuroses. In general, I know of no condition more troublesome than a combination of la grippe and syphilis.

One of the important factors in nervous vulnerability in syphilis is defective elimination. Not only do the syphilitic toxins give rise to serious results under such circumstances, but the patient shows intolerance of anti-syphilitic remedies. The so-called idiosyncrasy which makes mercury and the iodids obnoxious to certain patients, often means defective elimination. Iodid intolerance may signify a sluggish or damaged kidney. The influence of trauma in the determination of syphilitic processes must be admitted; this applies to nervous as well as to other lesions.

From this brief survey of the determining factors of syphilitic phenomena, it is evident that the question of vulnerability of tissues and organs, and espe-

cially of the nervous system is of great practical importance. I have admitted for the sake of argument, that all syphilitics do not present early toxin neuroses. I will now proceed to contradict this assertion. Every syphilitic in my estimation, suffers from toxin neuroses, but as suggested in the early part of my paper the routine neuroses are not recognized as such.

One of the early phenenoma of syphilis is the so-called syphilitic fever. This condition consists of an *ensemble* of symptoms of which a high temperature is by no means the most prominent feature. Headache, malaise, neuralgic and rheumatic symptoms occur, and in some cases prove quite troublesome. These various phenomena and indeed, the fever itself, I believe to be due to the action of the toxins upon the sympathetic system, and upon peripheral and central nerve structure. Perverted metabolism from the intoxication of the sympathetic may explain the fever quite satisfactorily. It is to be noted in this connection that not all cases develop this fever. When it does occur, I believe it to be due to nervous instability—so-called idiosyncrasy in this instance. This idiosyncrasy is similar to that which produces untoward effects of drugs, the toxins of shell fish, over-ripe tomatoes, etc. Carrying the argument a little farther, we have an explanation of the initial eruption of secondary syphilis—the roseola. Unlike all other lesions of the skin and mucous membranes, this form does not present in its macules an accumulation of syphilized germinal cells, but a simple vascular change involving vaso-dilation, stagnation and disorganization of the red corpuscles with a liberation of their pigment.

The lesion is non-destructive, and more or less transitory, leaving in its train a coppery or brownish red stain. This roseola is most logically explained by an aberration of vasomotor impulse due to the action of the syphilitic toxins upon the sympathetic. Analogical reasoning is not always satisfactory, but in this instance the analogy furnished by the untoward effects of drug and other toxin eruptions appeal to our sense of clinical discrimination most strongly. Apropos of other toxin eruptions, I desire to call attention to the form that sometimes appears in diphtheria—not the scarlatinoid, in which a mistake in diagnosis or even a mixed infection are possible, but that later type which heralds approaching dissolution. Here, we often have a very fair imitation of the syphilitic roseola.

Another lesion of early syphilis which appeals to me as a neurosis—trophic if you please—is the alopecia. I fully realize that I am treading on dangerous ground; the close association of alopecia with tangible cell deposit in other situations has led to the tacit acceptance of this lesion as an evidence of the action of the *materies morbi* of syphilis *in loco*. Some authorities believe it to be due to local empoisonment of the hair follicle with resultant nutritive perversion. Otis, following Bäumler, and Besiadecki, thinks that alopecia syphilitica is due to pressure innutrition of the hair follicles produced by an accumulation of syphilized cell material. I myself long taught this view. A moment's reflection should convince one of its fallacy. The following considerations are important in this connection:

1. Lesions of the scalp of sufficient prominence to attract attention are rather exceptional in syphilitic alopecia, a few scattered papules and accumulations of epidermal cells or sebum being found in a certain proportion of cases.

2. Scarring is rare and when it does occur, permanent baldness of the affected area results as a rule.

3. Tertiary syphilis in which cell accumulation is most marked is rarely causative of characteristic alopecia.

4. Severe alopecia, not only areate but generalized, may occur without any other lesion. This could hardly occur if the alopecia were due to cell deposit, inasmuch as in the early secondary period when alopecia is most often found the tendency to cell deposit is quite generalized.

Reasoning by analogy, we find much support for the neurotic theory of alopecia. The effects of fright, fevers and head neuralgias on the color and nutrition of the hair are well known. Leloir, Dumesnil and others have cited cases where traumatism of the sympathetic has produced alopecia. Joseph's experiments are quite significant in this connection. He divided the spinal ganglion of the second cervical nerve in cats and thereby produced baldness.

Accepting as I do, the nervous character of the syphilitic roseola and alopecia, these lesions are to me very suggestive. If they are due to disturbance of the sympathetic we have only to imagine similar vasomotor and tropho-neurotic changes in the central and peripheral nervous system, to get a tolerably clear idea of more serious neuroses in early syphilis.

To sum up the question of toxins in early syphilis, I believe that they bear a most important relation to the cephalalgias, neuralgias, bone pains, myalgias, paralyses, and rare cases of mental disturbance found in early syphilis, which affections for the most part are an evidence of the action of the toxins on the nervous system, and especially upon the sympathetic. These disturbances are often transitory, independently of treatment but they leave behind them a vulnerability of nerve tissue which may determine much more serious trouble later on. Precisely how the toxins act we do not know—we are as ignorant here as in the case of many other organic poisons. That vascular changes bordering on inflammation of nerve structure and its envelopes occur in some cases is probable enough, but is difficult of proof. The earlier the disturbance the less likely it is to be due to organic cell deposit.

In concluding what I have to say regarding the relation of the toxins to syphilitic nerve and brain disease, I desire to call attention to one point involved in the views of our distinguished Fellow, Dr. Bannister, to which I beg leave to take exception. I believe firmly that he is correct in his position regarding the syphilo-toxic origin of some cases of general paresis, but I do not believe that the toxin remains latent in the system for a prolonged period. He does not believe that the toxins prepare the way for paresis, but that they exist and are operative at the time the paresis begins. With the cessation of bacterial evolution, I believe that the toxins are eliminated—I do not believe they are stored up for future morbid action. Bacterial evolution probably ceases with the cessation of the active period long before general paresis develops. Cerebral syphilo-toxemia possibly does pave the way for paresis, but it probably does so by profoundly perverting the bio-chemism and possibly in a minor degree, the structure of the cerebral tissues. This impression produces no very disastrous results in the early history of the case, but later on, as nutrition becomes relatively impaired by advancing age and directly impaired by intervening

pathogenetic factors, serious trouble results. It is a fact well known in pathology, that early damage to tissue may not reveal itself for many years—this aside from disease due to germ infection. This is even true of some cases of malignant disease.

In studying the nervous phenomena inferentially due to cell infiltration in early syphilis, it is to be understood that it is difficult to differentiate them from the toxin variety. The later the development of the phenomena, the greater the probability of the existence of definite organic lesions. In late secondary and tertiary lesions these may be well marked. In a general way, the toxin neuroses have their point of departure during the first three or four months of syphilis, the later varieties being of neoplastic origin. The younger and more active the germ the more virulent and abundant its toxins. In the true tertiary period the syphilitic germ and its toxins are probably no longer a factor in syphilitic neuropathology, save as respects the tissue vulnerability and morbid cell impulse already described.

The exceptions to the general rule regarding the dependence of the very early nerve disturbances upon toxins are chiefly cases in which hemiplegia or some severe form of paralysis develops; in hemiplegia especially, the inference that a localized cell accumulation exists is usually justifiable.

Organic or functional nervous disturbance is produced by syphilitic new growth in numerous ways, viz:

1. By invading the lymphatics surrounding nervous structure.
2. By involving the tissues, chiefly the lymphatic vessels, surrounding the blood vessels supplying or draining the part.
3. By invading the arterial walls.
4. By infiltration of connective and other tissues about nervous structures.
5. By involvement of the nerve or brain tissue proper.
6. By involving nerve sheaths or the cerebro-spinal meninges.

These various conditions act by producing:

1. Irritation.
2. Pressure innutrition, and occasionally degeneration.
3. Passive hyperemia and edema from venous obstruction.
4. Localized anemia (ischemia) from arterial obstruction.
5. Blocking up of the affected area by lymphatic obstruction.

It is rare that extensive destruction of tissue from breaking down of the neoplasm occurs in the earlier nervous lesions. It is to be remembered, however, that gumma at an early period may develop from the intrinsic malignancy of the disease.

The predilection of syphilitic cell growth for lymphatic glands and capillaries is well known; most of the neoplasia of syphilis are essentially processes of lymphatic infiltration and obstruction. This is not only true of the active but also of the sequelar or gummy period. In the latter, however, the process is largely one of lymphatic obstruction and congestion, while in the former, essential infiltration of lymphatic structures exists. The difference between the two may possibly be explained by the hypothesis that the gummata are chiefly due to old-time injury of lymphatic tissue by the essential infiltrations of this tissue incidental to the active period.

Vascular involvement—direct or by the pressure of syphilitic cell growth—is probably the most important factor in the etiology of organic nervous disease in early syphilis; as already remarked, however, the more remote the period after the chancre, the more likely is the process to be due to arterial disease.

The apparent predilection of the syphilitic process for arteries of medium size, and especially those of the brain is well understood, but has not been satisfactorily explained. A brief consideration of a special anatomic point—which still further emphasizes the importance of lymphatic pathology in syphilis—makes this circumstance fairly intelligible.

The peri-vascular lymph spaces are an integral element of the lymphatic system, and share in its special susceptibility to syphilitic involvement. Pressure upon and inelasticity of small or medium sized arteries, quite seriously disturb nutrition of the supplied area, with consequent aberration of function in the latter. This is a very important matter as regards the brain. The perivascular spaces of the large trunks are involved it is true, but the resultant pressure and inelasticity are a trivial matter in comparison with the resisting power of the large arterial tubes and the relative quantity of fluid forced through them.

Another vital point is this; the tunica adventitia of the vessels is probably a part of the lymphatic system; it certainly is extensively involved in early syphilis. Hutchinson seems to believe that the tunica intima is primarily involved, the adventitia sometimes and the middle coat only secondarily, but despite so weighty an opinion, the author inclines to the view that the point of departure is the adventitia. Apparent evidence to the contrary probably depends upon the fact that most of the cases studied have been late cases.

Hutchinson says that syphilitic arteritis does not produce aneurysm. This is true as regards the early stages, but the endarteritis of late syphilis is a most prolific cause of those miliary aneurysms which bear so important a relation to cerebral disease, especially of the apoplectic variety.

With reference to Mr. Hutchinson's opinions of vasculo-cerebral syphilis, it is a peculiar fact that some of the cases which he records are directly opposed to his own views regarding the point of departure of the pathologic process. He quotes a case reported by Sharkey in the transactions of the Pathological Society of London, of a man who died of vasculo-cerebral disease in the seventh month of syphilis, while still covered with a secondary eruption. The disease was symmetrical, affecting both middle cerebrals. "*The process had begun in the tunica adventitia and had spread inward.*"[1] Both arteries were occluded, the right completely so, and the areas supplied by them were softened. The patient had suffered from headache and was under treatment for syphilis when he had suddenly passed into a semicomatose condition, with convulsions of the extremities; in this state he remained until his death one week later. Another case which he quotes, is from Dr. Clifford Allbutt, of Leeds. The age of this patient's syphilis is not given. In the brain were found scattered masses of syphilitic neoplasm involving the smaller arteries; these varied from the size of a pea to a walnut and were somewhat indurated. *Micro-*

[1] Italics mine.

scopic examination showed that the process began with cell exudation and proliferation in the perivascular canals, finally causing great perivascular thickening." [2]

The Fellows of the Academy will please note the support afforded by these cases to the views which I have expressed regarding the relation of the tunica adventitia and the perivascular lymph spaces to the initial arterial lesions of syphilis. It would appear that Hutchinson has formed his conclusions mainly from cases of late syphilis in which the point of arterial departure is often lost in the extensive gummy changes and secondary degenerations of this period. The earlier vascular changes which are really at the bottom of the difficulty have usually disappeared, the latter changes which replace them being given credit for the entire field of pathologic change. In the presence of large diffused gummata, with or without degeneration of the inner tunic of the vessels, it is by no means surprising that the earlier changes are masked, underestimated or entirely overlooked, even though they have not completely disappeared, as I believe they are most likely to do. Early perivascular exudate especially, may produce most disastrous effects on vascular wall nutrition and yet be removed in due time. Its presence in tertiary cerebral syphilis would be conclusive; its absence, however, argues little. It is probable that the arterial changes of early syphilis are chiefly operative in the production of ischemia of the brain and nerve tissue, with resultant loss of function. Vicarious hyperemia from obstruction of certain areas and compensatory pressure in others, supplied by sound vascular twigs from the same vessel, is a possible element. Passive congestion and edema from venous involvement are additional possible factors. Hutchinson has called attention to a peculiar form of periphlebitis due to syphilis; this may occur in the brain.

It is not beyond the bounds of logic to assert that all of the conditions described may possibly co-exist and that intoxication by syphilitic toxins may be superadded.

Hemorrhages, distinct tumors, embolism, thrombosis, vascular ulcerations—softening of the tunica intima—are not to be expected in this early stage. Intra-cranial nodes, while possible, are certainly rare at this time. Meningeal infiltrations probably occur, but as a rule do not appear to excite symptoms. Such damage as may be done early in the disease manifests itself by symptoms at a relatively much later period.

It is obvious from what has been said, that the changes mentioned as characteristic of syphilitic cell deposit, are much more likely to be localized than those due to a universally circulating toxin. It is to be remembered, however, that the toxin may cause symptoms referable to a particular area of nervous distribution, by producing aberrations of vasomotor impulse through its action on the sympathetic. Involvement of nerve and brain tissue has been mentioned as occurring in very early syphilis, but it must be very rare. Such invasion as does occur must be slight, and acts merely by laying the foundation for later gummy disease. It will be understood in this connection, that I do not deny the possibility of precocious gummata of the brain. In such cases, however, there are abundant extra cranial evidences of malignancy. In a general way it will be found that large circumscribed gummata are characteristic of the tertiary period, while those of the earlier period are not only small but disseminate. The disseminated lesions of early involvement of the choroid, fairly illustrate what may be expected in the brain in early syphilis.

(To be continued.)

[2] Italics mine.

SOCIETY PROCEEDINGS.

Associated Health Authorities of Pennsylvania.

Second Annual Meeting held at Harrisburg, Jan. 30, 1895.

MAJOR M. VEALE, First Vice-President, Health Officer of Philadelphia, presided.

GOV. D. H. HASTINGS, ex-officio President, was presented with a handsome gavel by Dr. B. Lee in behalf of the State Board of Health.

SECRETARY ATKINSON, in the absence of Dr. C. McIntire, read his paper on

THE SANITARY TREATMENT OF COMMUNICABLE DISEASES.

A communicable disease is one able to be communicated from one person to another, either by direct contact or through food or drink. The sanitary treatment is the means adapted to prevent this. Our methods depend upon the hypothesis we adopt. Thus cholera flourished in spite of our efforts, till we learned that it was a waterborne disease; then our efforts succeeded. Many diseases are known to be associated with a pathogenic microbe, the method of conveyance differing with different diseases. When a disease is to be combated, the Health Officer adds materially to the expense, etc. Hence in our sanitary treatment we should impose no unnecessary burden. We should live up to the knowedge we have; thus in typhoid, as we are reasonably sure that it is not carried by the air, but by the person becoming soiled by the alvine discharges from the patient, there is no need to include this disease among those where special precautions are to be taken for transportation upon railways, etc. Cerebro-spinal meningitis does not seem any more communicable than pneumonia; then why should physicians be compelled to report it? We should frankly acknowledge our limited knowledge, and where the case involves unsolved problems, our precautions should include an attempt to protect against every plausible method of communication. We should ever be on the alert to learn new facts, and modify our treatment accordingly. The Health Officer should be a physician, not a policeman. The municipality should be willing to pay as much to him as to its attorney or surveyor. Without this a self-respecting physician should decline the position. On these foundations, I will outline the treatment. Diphtheria will be a good illustration. Compulsory notification should be insisted on. If in doubt as in chickenpox, it should be reported. In diphtheria, not only pseudo-membranous croup but diphtheritic sore throat should be reported. With proper care, no harm will result, lives may be saved and a source of temptation removed from the physician who may desire to save the patient from the surveillance of the Health Officer. This person visits the house as soon as possible, and in diphtheria separates the sick and the attendants from the well, if necessary sending them to a hospital. Next he inoculates as many prepared tubes as he may require with the secretions of the throat of every one, quarantines the house till the bacteriologist reports, say twenty-four hours. If needed, suggests to the attending physician the use of antiseptic sprays to the air passages of the apparently well. It is not wise for him to suggest any treatment for the sick. He directs isolation. In diphtheria two rooms are enough; one for the patient, one in which the attendants change clothing before mingling with others. The nurse is to be instructed in disinfecting the discharges, especially from the throat and nose. Restriction depends upon the intelligence and willingness of the family. When the bacteriologist reports, raise the quarantine from those free from the microbe. If the isolation has been observed, and throats sprayed, the chance for infection has been slight. If others

show presence of the microbe, isolate at once and refer to the physician. Placard the house at first visit. The Health Officer should next visit the school or work shop of the patient, and inoculate tubes from the throats of every one in the room. Further precautions will depend upon the result from these tubes. All articles capable of disinfection should be so treated. When recovery occurs, continue isolation till the throat is free of bacilli; no other time will be safe. If death occurs no public funeral should be permitted. Dr. Geo. Duffield's "prophylaxis" is bacteriologic diagnosis; quarantine of quarters; isolation absolute with one nurse; better disinfection under the charge of the Health Officer; notifying pastors of churches and superintendents of Sunday schools of the disease and its locality; the establishment of the overflow drinking cup in all our schools.

Major Veale emphatically indorsed the points in the paper, and quoted largely from his experience with the city of Philadelphia.

Mr. Crosby Gray, of the Department of Public Health read a paper on the

LEGISLATIVE RESTRICTION OF COMMUNICABLE DISEASES.

He indorsed the whole of the paper of Dr. McIntire. The foundation for this treatment is law; education will not suffice. The health authorities must be notified early. Unfortunately, some doctors say diphtheria is not infectious nor contagious. These persons must be met and if such a one purposely diagnosed wrongly, his is the responsibility. The law must name those diseases to be reported; then the health authorities must be empowered to act, to isolate, either at home or remove to a hospital. Placarding is very necessary. It protects the community and discourages indiscriminate visiting. The public must be informed how to avoid the disease. The law must not permit placards to be removed, and must require in case of death that the body be disinfected, placed in a coffin in as short a time as possible and not again exposed. The funeral must be private, and the burial speedy. Under no circumstances should children be permitted at the funeral. The services, if any, should be brief, and no transfer of the corpse allowed to another house. Heads of families and heads of churches should be held responsible for infraction of this law. The law should also authorize the thorough disinfection of the premises, the clothing, everything, and this must be done by the authorities, not trusted to the family. He had great faith in fire, hence burn up all articles that can be so treated. Vehicles in which such bodies are removed should be prescribed by law, as often disease is spread by the use of a carriage in which others ride with the corpse. Schools are hotbeds for the spread of disease, hence the law should prevent return to school till all danger is past. Certificates of the danger being past should be demanded, and these based on the bacteriologic examination. Next, certificates of vaccination required before entering school should set forth a successful result. Again, those who have suffered with variola should not be allowed to mingle with others till pronounced free from infection whether by their clothing or persons. The law should not permit the transfer, in any way, of furniture so infected, as this is a common mode of carrying disease. No buildings should be rented until fully disinfected satisfactorily to the authorities. Dr. McIntire gives excellent advice but the law must stand by and enforce these provisions.

Major M. Veale read a paper on "Compulsory Vaccination. Will Vaccination Protect?".

Dr. W. M. Welch, in charge of the Municipal Hospital for Infectious Diseases, Philadelphia, speaks from an experience of twenty-five years, and nearly 6,000 cases. Variola 2,831 cases; deaths 1,534, per cent. 54.18; varioloid 2,169 cases; deaths 28 per cent. He says: "All unvaccinated cases if recovery took place, were disfigured for life; all vaccinated after a few months showed little if any appearance to indicate that they had suffered. Whole families have been brought to the hospital, all the unvaccinated ill with smallpox, the vaccinated children not." He gives the most positive testimony to this end. During all these years he saw no nurse, laundress, cook, etc., when properly vaccinated before going on duty, take smallpox. He believes that if all persons were properly vaccinated in infancy and again at puberty, smallpox would disappear. Dr. Severidge, an eminent Scotch physician, gives similar testimony. The Board of Health of Philadelphia, from its experience demanded the right to enforce vaccination.

Dr. A. H. Doty, Health Officer of New York, considers it evident that the people of this country are not protected as they should be. Many children remain unvaccinated as late as the fifth or sixth year, and revaccination receives practically little consideration. In London, in 1790, in 100,000 persons there were 712 deaths; in 1883 the average was 3 40. Primary vaccination but not re-vaccination is compulsory in England; in Germany both are compulsory, and the deaths in 100,000 were 0.30. This proves the need of vaccination. Neither prejudice, ignorance nor any other personal consideration can intervene to prevent the law-making power which has been lodged by the people with the government of the State, to make all needful regulations touching the security of public health and human life. This power in the State is qualified only by such conditions as to the manner of its exercise as are necessary to secure the individual citizen from unjust and arbitrary interference.

Dr. J. T. Rothrock, of the State Forestry Commission, was invited to the privileges of the Association, and spoke in reply on the great need for a number of public reservations to preserve the forests, and which he said would equal, if not surpass, the sanitary surroundings for which the Adirondacks were so famed.

A resolution was unanimously adopted urging this upon the attention of the Legislature.

At the afternoon session, it was agreed to petition the Legislature for $1,000 to publish the proceedings of the Association.

Major Veale having presented the subject of the "Need of Hospitals for Tuberculosis," a special committee was appointed on that subject.

By request, Dr. W. B. Atkinson detailed the proper methods for prevention of diphtheria by the use of chlorin and sulphur in the infected house. The laws of the Association were amended to admit as Associate Members all who had formerly been members of local health boards, etc.

THURSDAY SESSION.

The officers for 1895 were elected as follows: First Vice-President, Major M. Veale, Philadelphia; second Vice-President, Crosby Gray, Pittsburg; third Vice-President, Dr. W. E. Allen, Scranton; Treasurer. Dr. J. C. Green, West Chester; Secretary, Dr. Wm. B. Atkinson, Philadelphia.

On motion, His Excellency, ex-Governor Robert E. Pattison, was made an Honorary Member. The Legislature was petitioned to pass acts for the creation of township boards of health, as well as a number of other acts tending to aid in the proper sanitation of the State.

Dr. Hugh Hamilton, Harrisburg, exhibited and explained charts showing the relation of topography and sewerage in the town.

M. G. Lippert, C. E., read a paper on the "Best Means of Educating the General Public in Matters of Practical Hygiene." Under hygiene we understand that branch of science which treats of the preservation and promotion of health. Sir John Simon says: "Ignorant men may sneer at the pretensions of sanitary science. Weak and timorous men hesitate to commit themselves to its principles, so large is their application. Selfish men may shrink from the labor of change. Wicked men may turn indifferently from considering that which concerns the health and happiness of millions of their fellow creatures, but in the great objects which it proposes to itself it transcends in importance all other sciences, and in its beneficent operation it seems to embody the spirit and fulfill the intentions of practical Christianity. Yet there is less attention paid to its study than any other branch of science. It is uphill work to interest the public; we have to look to the schools to lay the foundation. Physiology and hygiene as taught in the schools is nothing but a series of temperance lectures and an effort should be made to interest our legislators to amend the laws and allow of a more rational instruction in hygiene. Once properly taught, time is only needed to have it exert a beneficial influence on domestic and public life. We must not wait, but educate our cotemporaries by disseminating information through the press, pamphlets, circulars, etc. Our own State Board is doing good work and local boards can aid in epidemics by publishing these matters in their local papers. The people are led to study them and thus we educate them. Unfortunately, epidemics are needed to waken them to this study. Health journals play an important part; monthlies are now publishing articles on the subject in an attractive form; sanitary associations are also aiding, but best of all are local sanitary associations. Voluntary sanitary committees have been formed in a number of localities in the State. These should be instituted everywhere, and the women should be enlisted and then trust to their good sense, tact, influence and enthusiastic coöperation. We find by their Health Protective Associations in Philadelphia, Pitts-

burg, etc., that they are fully alive, and smaller places may pattern after these. Physicians, civil engineers, lawyers, editors, etc., should be called on by the ladies to aid by their intimacy with many points. Let us all make the effort and organize our own communities. It may take time, patience and perseverance, yet it is worth the effort.

After some discussion DR. GROFF offered the following:

WHEREAS, It has been affirmed that the instruction in hygiene and sanitary science in the public schools of the State is from books, unreliable and without scientific standing; and,

WHEREAS, These allegations are denied; therefore be it

Resolved, That the President appoint a committee of three to examine the books in use and the methods employed in teaching hygiene and sanitary science in this State, said committee to report at the next annual meeting of this Association.

The committee was increased to five and the resolution adopted.

DR. J. S. CARPENTER, of Pottsville, read a paper on "Typhoid Fever," giving details of the epidemic at Mt. Carbon, with charts showing the gradual progress of the disease from the initial case.

DR. E. G. MATSON, of Pittsburg, read a similar paper, showing how the disease progressed in cities.

DR. J. C. HUTTON, Health Commissioner of Harrisburg, exhibited and described diagrams of hospitals for contagious diseases in cities and towns of modern size. He showed how readily and cheaply such hospitals could be prepared and fully relieve the locality of the dread pestilence in their midst. This attracted much attention, and regret was expressed that the time did not permit of a visit to such a building some miles out of the city.

DR. B. LEE spoke on the proper use of disinfectants, detailing the best for each special occasion and the need of their use, with proper intelligence, the frequent waste and improper use giving rise to false security and the continuance of disease.

A special committee was appointed to prepare a code of health laws for the State, that all Boards may work under uniform conditions.

PROF. T. M. DROWN, Chemist of the Massachusetts State Board of Health, addressed the Association and a few members of the Legislature in the evening, showing how the work was being done in his State, and the good flowing from it in the way of water supply examinations, etc.

SELECTIONS.

Symptomatology and Diagnosis in Spinal Traumatisms which Involve the Osseous Framework.—Abstract of an essay read before the Section on Surgery at the International Medical Congress at Rome, April 3, 1894, by Dr. T H. Manley, of New York. Dr. Manley said: "The symptomatology of osseous disorganization in traumatisms of the spine is anything but definite; the bony segments of the vertebral column are so deeply lodged, so powerfully braced, and so shaped and heaped on each other by such an imbricated arrangement that nothing less than great and concentrated violence can cause a fracture of them, and when it does occur in the large majority of cases there is no visible or palpable displacement. In the greater number the cord entirely escapes, or only suffers such trivial contusion that nothing more than a temporary numbness at the periphery, supplied by the nerve roots beyond the site of injury, follows. In the greater number of cases the apophyses alone suffer fracture when the transverse spinous process or posterior neck is involved; but it is only when the displacement of the fragments is inward and the cord is crushed through that symptoms of paralysis or paraplegia follow. There is every reason to believe that the spinal cord can bear moderate compression and laceration, combined with considerable longitudinal tension, without sustaining any serious damage. Experimentation has clearly proved that the spine may sustain fracture involving the apophyses and extend completely through the bodies without a single neural symptom following. In several animals on which I have instituted experiments to determine this question, I was able to produce the most extensive description of fracture, in several of which the spinous body was completely fractured horizontally across and through, thereby producing a distinct communication between the posterior mediastinum or pleural cavity and the spinal canal; and yet no paralysis of any kind succeeded the physical violence employed. Spinal fracture possesses no definite symptomatology; therefore, it may be said, its diagnosis in many cases is quite impossible.

"Fortunately for the patient, the failure to accurately locate and appreciate the precise extent and character of the fracture in no important manner influences treatment. Of late, since the advent of the antiseptic method of wound treatment, some have advocated the making of a free incision over the plane of suspected fracture, when we would be enabled to freely explore the suspected area and, if need be, at the same time deal with the displaced fragments. At first sight this might seem a rational and prudent line of action, though if we investigate but superficially into the anatomic, structural composition of the spine, and consider what occurs in a fracture in this region we shall the better appreciate its fallacious foundation. The spine is not, as has been alleged, in any manner analogous in structure or arrangement with the head; and therefore, because we may generally, readily, and safely expose the brain the same can not be done with the spinal cord. The spinal cord, being very deeply lodged, is always very difficult of access and requires an extensive sacrifice of bone in order to make an opening of ample size to explore and manipulate through. And now, after our incision, which in this region is always attended with a great loss of blood where the bones are exposed: *a*, there may be no fracture; *b*, one or more fractures may escape detection; and *c*, if the fracture involves one or more of the bodies our posterior incision will avail us nothing, as the cord fixed in position by its nerve roots, obscures our view of their posterior surfaces. If, however, there has been a positive depression of the bony fragments on the cord and it is completely crushed through, of what avail will be an exploratory incision or a laminectomy in the way of repairing or restoring an organ totally destroyed beyond the point of compression? Not only is the diagnosis of spinal fracture often attended with quite insurmountable difficulties on the living, but even on the cadaver it may very often escape detection or be but imperfectly recognized by the *en courant* method of making necropsies on those who are presumed to have succumbed to spinal injuries, or they are associated with other internal complications. A post-mortem examination of the spine for a traumatic lesion of it, in order to be thorough, exact, and of any scientific value, always requires that the entire spinal column should be completely detached from the occiput, ribs and sacrum. Then it should be brought into good light, and segment after segment, when the soft parts have been removed, be carefully manipulated and scrutinized. When the examination has been completed it may be returned and fixed in the breach from which it was removed and be covered in."—From the *London Lancet*.

NECROLOGY.

R. C. CHENAULT, M.D., February 8, at his home in Glenview, near Louisville, of pneumonia. Dr. Chenault was born near Richmond, Madison County, Ky., and was a brother of Col. Waller Chenault, of Morgan's command, who was killed in the battle of Green River Bridge, and a cousin of Prof. J. W. Chenault, the well known educator of this city. He was graduated from the Jefferson Medical College, Philadelphia, and on his return formed a partnership with Dr. Alexander R. McKee, a noted physician of Central Kentucky. Later, he was appointed by Governor Leslie as Superintendent of the Eastern Insane Asylum at Lexington, Ky., which he managed with ability. After retiring from that place he established the High Oaks Sanitarium at Lexington. Three years ago he removed to Louisville, and retired from active practice. He was 60 years of age and a life-long member of the Baptist Church. His remains will be buried in his old home at Richmond, Ky.

D. H. OLIVER, M.D., of Indianapolis, February 3.——Jessie D. Wood, M.D., of Topeka, Kan., February 2.——Nimrod Thompson, M.D., of Smyrna, Tenn., February 1, aged 83.——F. R. Graham, M.D., of Chester, Pa., January 27, aged 69. Cyrus Falconer, M.D., of Hamilton, Ohio, January 28, aged 85.——John K. Stark, M.D., of St. Louis, January 26, aged 66.——J. O. Whitney, M.D., of Pawtucket, R. I., January 23, aged 72.——C. A. Morse, M.D., of Cambridge, Mass., January 31, aged 83.——G. A. Rex, M.D., of Philadelphia, February 4, aged 50.

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SATURDAY, FEBRUARY 16, 1895.

HYPNOTISM AND CRIME.

Our readers will recall that a few years since there was much written on this subject in French journals relative to the celebrated case of GABRIEL BOMPARD, who committed a capital crime while, as she claimed, under hypnotic suggestion. Of late there has been a revival of the discussion in this country, and one man has been acquitted of murder and his alleged hypnotizer convicted. In another place a reign of terror has been established not unlike that which prevailed in Salem during the celebrated witchcraft epidemic.

While the general phenomena of hypnotism have been fairly well understood by the profession, a very exaggerated opinion of the power of this condition has obtained among the laity. Sensational novels of the Trilby order have done much to spread, not a knowledge of hypnotism, but a more or less distorted caricature illuminated by the fervid necessities of the story writer.

Sensational views like the above will be scouted by the scientific, yet there is a sufficient substratum of truth in the phenomena of hypnotism to make its medico-legal relations of great importance. It is a singular fact that even recent works on medical jurisprudence, notably the "System of Legal Medicine" (R. B. TREAT, 1894) practically ignores the forensic aspects of the subject.

One great difficulty in defining the forensic relation of hypnotism was to get some fixed point. It all seemed so vague and intangible that the application of legal rules appeared to be hopeless. This difficulty has been overcome by an article from the pen of THOMPSON JAY HUDSON (*New York Medical Journal*, Jan. 26, 1895). The writer rejects the theories of CHARCOT and RICHER, that hypnotism is but a phase of hysteria and accepts the definition of BERNHEIM, that it is "the induction of a peculiar psychical condition which increases the susceptibility to suggestion." It is the view that hypnotic influence is an essence or current, that proceeds from the operator, and not a subjective state only in the person hypnotized, is what gives this subject such terror for the ignorant.

MR. HUDSON shows how the prevalent view that a person may be induced to commit a crime while under its influence, is brought about by the fact that a person in such a state usually accepts the will of the operator as his own. If the operator suggests that he is an angel or a demon, he will act the part to the life within the limits of his mental and physical capacities. He points out how these facts with the various laboratory experiments have been made to do duty in formulating a very incorrect idea of the power of suggestion while in the hypnotic state.

The laboratory experiment in which a hypnotized person is given a dagger and informed that it is a real dagger, and told to strike at another person, is supposed to represent what might actually occur in real life were the hypnotizer an evil disposed person who wished a certain crime committed and had the subject well under control. MR. HUDSON points out how very erroneous such a deduction would be, for he says the conditions are very different in real life. In a laboratory experiment, the one who is hypnotized knows he is surrounded by friends, that no possible harm will come to him or to others, and that in yielding to the will of the operator no chances are taken These unconscious or what HUDSON terms, auto-suggestions are the real ones which influence the hypnotized person, that is, if one suggestion counteracts another, no action will take place. If one is stronger than another, action will take place along the line of least resistance. He therefore divides auto-suggestions into four classes: 1, volitional; 2, moral and educational; 3, instinctive; and 4, environment. Therefore the argument becomes simply this, that in a given case, if a person in a hypnotic state has a criminal act suggested to him, if he yields to that impulse, he is essentially a criminal in his nature. If, on the contrary, instinctive, moral or educational suggestions are encountered, the act will not be done That this is a fact, and that very little importance can be attached to the laboratory experiment, is well shown by the example cited by DR. JAMES R. COCKE, of Boston. Standing in front of a deeply hypnotized subject, he placed a card in her hands, telling her that it was a dagger, and commanded her to stab him. This command was immediately obeyed with the greatest alacrity. He then handed her an open pocket knife and again commanded her to stab him. She raised her hand as if to execute the command,

but hesitated and immediately had an hysterical attack, which put an end to the experiment.

The explanation of the foregoing is to be found in the instinctive and moral auto-suggestions previously existing in the mind of the patient. If they are of sufficient strength to overcome the oral suggestions of the operator the act is not committed; if, on the contrary, the auto-suggestions are imperfect they will not neutralize the oral promptings and the latter suggestions will prevail.

It will be seen, therefore, that no new psychical elements are introduced into the problem, but the old ones of criminal surroundings and environment which furnish the motive for the commission of all crimes. The logical deduction from these premises is that hypnotism as a defence for crime can have no standing in a court of law; that the commission of crime is as much determined by the moral character of the individual in a hypnotic state as it is in his waking moments.

THE PATHOLOGY OF NEURITIS.

The importance of the pathologic condition of neuritis or inflammation of the nerves has been fully recognized only in a comparatively recent period. In the older books it is often only mentioned as a rare or exceptional condition, and as late as twenty years ago text-books on nervous disorders scarcely noticed it, or did so only as a possible complication of other diseases and of traumatisms. Still its importance and prevalence were emphasized by a few leading authorities, notably, REMAK, ERB, WEIR MITCHELL and others, and it can not, therefore be regarded as a new discovery in pathology; it was rather only an overlooked fact by the many, and was acknowledged but by the few. The recognition of the frequency of neuritis in later years may perhaps be said to date from the elaborate discussion of the subject by FRIEDREICH in his monograph on progressive muscular atrophy and by ERB in ZIEMSSEN'S "Handbook of Special Pathology and Therapeutics," and the writings of WEIR MITCHELL in this country, who demonstrated its importance at a comparatively early period. At the present time it plays an increasingly important rôle in nervous pathology and is found connected with a very large proportion of all the general systemic infections. It formed the subject of an interesting discussion at the Congress of French Alienists and Neurologists last year, where the prevalent view seemed to be that, except in special traumatic cases and those due to cold, etc., it is largely the result of some morbid agent acting on the nervous system. Whether this acted primarily in the nervous centers as held by ERB and others, or whether the action is peripheral throughout was not unanimously agreed; in a few conditions, such as lepra, it seems probable that we shall have to admit a purely peripheral infection and the later involvement of the centers as due to an ascending neuritis.

Two forms of neuritis, it was held, should therefore be recognized, the descending and the ascending, the former probably secondary to alterations in the brain or cord, and the latter a peripherally originating affection in which the higher centers are only secondarily affected. It was shown that the apparent intact condition of the central nervous system in many cases of polyneuritis did not necessarily imply that they had no part in the pathology of the affection, but only indicated that the changes recognizable by our methods were located in the peripheral nerves. Inflammation of the nerves is readily transmissible as irritation, only appearing in its fully developed form at points of special weakness, the "neuritis migrans" of KLEHM and others, and the periphery of the nervous system is in many ways one of its most vulnerable parts.

A very important communication on this subject is that of EDINGER, in which he offers what is to a considerable extent, a new explanation of the pathology of neuritis. Basing himself on the facts that active function of an organ involves its structural change, a tissue waste which under normal conditions is restored, but in conditions of weakness or innutrition leads to retrogressive alterations, and that a weakened and ill nourished tissue gives way and is encroached upon by the more active and healthy structures, he accounts for neuritic disorders by supposing a disproportion of function and restitution in the nerve, and proliferation of the interstitial tissue, the neuroglia, at the expense of the nervous elements and hence general nerve degeneration or neuritis. It is this encroaching of healthy upon diseased tissue that according to WEIGERT constitutes interstitial inflammation and sclerosis, and it has the effect of still further mechanically embarrassing and ultimately destroying function.

This theory does not do away with that of the generally infectious or toxic origin of neuritis, but it is perhaps the best that has been offered to explain its mode of operation. It is easy to see how under the influence of some abnormal agency the exhausted nerve elements may fail to undergo proper repair and neuritis ensue, and the theory has also an important and obvious bearing on the therapeutics. It also helps to explain many peculiarities, such as the proclivity of certain nerves to the neuritic process, the mild neuritis of old age studied recently by OPPENHEIM, etc. In many ways it clears up the hitherto somewhat dubious pathology of the disorder.

MEDICAL JOURNALS.

An old member of the ASSOCIATION, and one whose business qualifications have commanded scarcely less respect than his known professional skill, has sent

the editor a copy of a letter he addressed to a friend who consulted him about starting a new medical journal.

The reply ran something like this:

My Dear Doctor:—Your courteous letter asking my advice about starting a new journal is at hand, and in answer I have to say frankly that in my opinion we have too many medical journals now. Let us do our best to improve those we have, by contributions and pecuniary support and thus advance American medical literature.

Yours very truly, ———

No one can look over the list of medical journals without realizing that our fellow member told the truth. The essence of success lies in concentration. The scattering of energy and force is sheer waste. There are many medical journals worthy of life and continued existence. They have a field. Let them be supported. But when the day shall come that every two medical men own a medical journal, and every six medical men manage an alleged medical college, it is time to speak frankly on the subject. A half supported medical journal is a half starved one, and a half starved medical journal bears on its face a mute but appealing cry for sympathy and support which is quite as plain, as if the words were distinctly expressed.

Nor is medical science or the profession generally benefited by increase in the number of the journals. On the contrary, many a valuable article is lost or worse than lost by the obscurity in which it slumbers, an obscurity which grows deeper and deeper with the mutations of time.

A MATTER OF NOMENCLATURE.

The term, antitoxin, now so extensively employed to designate the sterilized blood serum of an animal rendered immune to a specific disease, is in some respects an unfortunate one. About four years ago it was applied to one of the coal tar derivatives and a company was formed in England for the purpose of exploiting the drug as a proprietary preparation.

It may be doubted whether the term is sufficiently specific to be applied to a single preparation, but is rather to be used in a general sense the same as antipyretic, antacid and antiscorbutic have been so long employed.

The term serum therapy, is an excellent one and ought to be retained, but "*heil serum*," that has been employed to designate the remedy for diphtheria is certainly very unfortunate as applied to a single product.

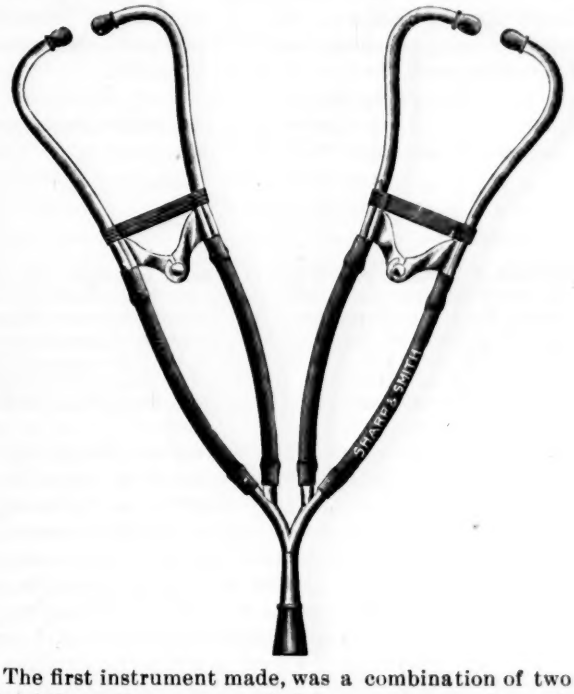
Why not drop the prefix anti, and simply compound the name of the disease with serum, thus "diphtheria serum, fifteen hundred antitoxin units?" Subsequently we may have varicella serum or scarlatina serum. The method is simple, expressive and avoids some of the confusion into which we have fallen.

CORRESPONDENCE.

Corwin's Double Binaural Stethoscope.

CHICAGO, Feb. 12, 1895.

To the Editor:—The accompanying cut represents the instrument which I have used in class demonstration of physical diagnosis in Rush Medical College for the past two years, with very great satisfaction both to myself and the students. By it both teacher and taught are enabled to hear sounds under like circumstances of time and place, and the instructor is therefore sure that what he hears and describes is heard by the student. Demonstration of sounds by the use of separate stethoscopes is sometimes tedious and uncertain, owing to the varying manner of applying the instrument, and the variable occurrence of adventitious sounds both in time, place and character, owing to the difference in the depth of respiration, occurrence of cough, and the various changes, functional and pathologic, which take place within the body.



The first instrument made, was a combination of two of Knight's stethoscopes, united by a common chest piece. While this proved the practicability of the idea, I have as regards durability, pliability and compactness, obtained a very serviceable instrument by uniting two of my own stethoscopes as represented. The same scheme has been carried further by a combination of four instruments with a common chest piece. But this has no further advantage other than that of a possible time-saver.

I recommend the double stethoscope to the profession as being of use possibly in some cases of consultation, but especially to those who are engaged in teaching this branch of medicine.

A. M. CORWIN, M.D.

An Old Instrument for Intestinal Anastomosis.

THE PRECURSOR OF THE BUTTON.

CHICAGO, Feb. 12, 1895.

To the Editor:—About seventy years ago a surgeon named Denans, in France, reported to the Royal Medical Society of Marseilles his experiments with an instrument acting on the principle of the intestinal button. The report was published by the Society in 1826. (*Recueil de la Societe Royale de Medicine de Marseille*, 1 an., No. 1, 1826.) Chelius, of Heidel-

berg, quotes it in the sixth edition of his "System of Surgery," translated by South in 1847, (vol. III, p. 509) in the following words:

"In complete division of the intestine, Denans introduces into the upper and lower end of the gut a silver or zinc ring, thrusting it inward about two lines from each end; he then brings the two ends together over a third ring, of which the two springs retain the external rings. The included ends of the intestine mortify, and the rings thereby becoming unfastened are discharged by stool, after they have united the serous surfaces in contact. This experiment in the dog has most successful results."

It is not clear that Denans tried his instrument on human beings. EDMUND ANDREWS, M.D.

American Medical Publishers' Association.

ST. JOSEPH, MO., Feb. 6, 1895.

To the Editor:—Please be kind enough to announce in your next issue, the meeting of the American Medical Publishers' Association, which will occur on May 6, 1895, at the Eutaw House, Baltimore, Md. A program of interesting papers is being prepared, and a full attendance of the medical publishers of the United States is desired.

Yours very truly,

CHARLES WOOD FASSETT, Secretary.

LANDON B. EDWARDS, M.D., President.

BOOK NOTICES.

Relations of Diseases of the Eye to General Diseases. By MAX KNIES, Professor Extraordinary at the University of Freiburg. Forming a Supplementary Volume to every Manual and Text-book of Practical Medicine and Ophthalmology. Edited by HENRY D. NOYES, A.M., M.D., Professor of Ophthalmology and Otology in Bellevue Hospital Medical College, etc. Octavo, 470 pages, illustrated, extra muslin. Price $4.25.

The doctrine of mutual interdependence taught by the fable of the belly and the members, was taught by what was apparently thought at the time a self-evident physiologic fact. Yet there is little doubt but the practitioner who palpates the abdomen, and searches the test meal carefully, usually forgets that the patient has any eyes, and the ophthalmologist as blindly ignores the fact that his patient has any stomach or any nervous system beyond the optic nerve. To be the mutual friend and Mentor, and perhaps referee between various specialists and the general physician and general surgeon is the object of this book, and it would seem on examination as if every possible connection between abnormality of the eyes, and injuries and diseases of the remainder of the body, was enumerated in its proper order. The book is not one to sit down and read from "title page to colophon" as one would a novel or a new book on serum-therapy but rather one for reference, in particular cases, as one looks at a dictionary for a particular word. But for all that, few books have been written more philosophically or from a broader physiologic basis. There is no redundancy or padding; the author holds closely to his text and the translator and editor have apparently made little variation from the original. We quote from the opening chapter:

THE NERVOUS SYSTEM.

"The relations between the eye and the nervous system are mutual. It is rare to find eye diseases the starting point for diseases of the nervous system. Much more frequently diseases of the nervous system, especially of the central organs, cause disorders of the eye. These may be of a functional character, or may be objectively visible, such as stasis, inflammation of the optic nerve, exophthalmus, spasm and paralysis of the ocular muscles, etc. The functional disturbances of the eye often constitute important local symptoms and are indispensable in the local diagnosis of brain diseases. On the other hand, the changes visible with the ophthalmoscope in the optic nerve, retina, vitreous body, etc., are of a more general character, and usually enlighten us rather as to the character, than the location of the disease of the brain."

Again, page 265:

DISEASES OF THE DIGESTIVE ORGANS.

"While there are manifold relations between diseases of the skin and the eye, this is true only to a slight extent of diseases of the digestive organs apart from a few very general occurrences."

And then follow reports of poisoning from the instillations of various medicaments into the eyelids, and the escape of the same through the nasal duct into the pharynx, ocular affections from diseased teeth, visual weakness from hemorrhages, yellow vision in jaundice and the like.

Taken all in all, this book occupies an unique place in medical literature and will be a valuable addition to any library not already possessing it in the original. The American editor has made some valuable additions, and has done his part well.

PUBLIC HEALTH.

Smallpox in Chicago.—There is a gratifying reduction in the number of new cases of smallpox in Chicago during the present month. Between January 1 and February 12 inclusive there was a total of 240 new cases, but of this number 201 occurred in January—a daily average of 6.5—and only 39 in February—a daily average of less than 3.3. The death rate is correspondingly reduced; for January the mortality was 17.2 per cent.; for the first twelve days of February it is 9.6 per cent. The total number of cases under treatment since January 1, has been 324, including 84 remaining over Dec. 31, 1894; remaining in hospital, midnight of February 12, 91.

Antitoxin as a Prophylactic.—During the epidemic of diphtheria last December, noted in the JOURNAL at the time, the Children's Hospital at Boston, Mass., was so seriously overcrowded that applications for admission were refused. It is reported that the disease recently appeared again in the institution and the diphtheria antitoxin was freely used as a prophylactic. All the patients were given an injection of the serum and admissions were allowed only on condition that each child should be so treated on entrance. It is asserted that all cases of diphtheria entered for treatment were cured, and that there was no extension of the disease among the new admissions, the immunization being complete.

An Absurd "Pure Food" Law.—The absurdity of the legislation against oleomargarine in the interest of "pure dairy butter" was laughably demonstrated last week at the annual meeting of the Pennsylvania State Dairymen at Meadville, Pa., when prizes were offered for the best butter exhibited. Mr. A. J. Palm, editor of the Meadville *Messenger*, who has strenuously opposed the present State law against "imitation butter," sent to Chicago for three packages, which he exhibited as butter and gave the names of three of his dairymen friends as exhibitors. The one pound package of imitation received second premium and a third premium was awarded on the five pound package. The five pound package of imitation butter scored one point higher than the best dairy butter in the one pound package.

Stamping out Tuberculosis.—It is estimated that it will require $500,000 to stamp out tuberculosis among the cattle in the State of Massachusetts. The following are the figures submitted at a meeting of the Committee on Public Health and Agriculture of the Massachusetts Legislature recently:

Whole number of cows in the State, 186,806; neat cattle other than cows, 47,528; number under one year old, 15,000; total number, 249,334. Ten per cent. of these being the number estimated to be infected, 24,933. Average value of these at $20 apiece, $498,660. Cost of making the test and sundry expenses, $101,340, making a total of $600,000, to which should be added $50,000, for salaries for the commissioners for five years, making a grand total of $650,000.

A bill before the Michigan Legislature provides that all persons before they can teach public or private schools in Michigan shall be examined and obtain a certificate from a physician that he or she is not afflicted with any communicable form of consumption. In support of the bill it is asserted that teachers having the disease have communicated it to their pupils simply by coughing and expectorating on the floor. Another bill before the same body calls for an appropriation to buy ground in the vicinity of the city of Ann Arbor whereon to build and equip a consumption hospital.

Hygiene of Paris in 1894.—The movement of the population of a city of 2,500,000 inhabitants constitutes a source fecund with practical teachings of hygiene, says *L'Union Medicale*. Pathogenic influences are felt there so keenly and translated in such exact proportions that they are amplified, so to speak, as by a projecting instrument. When the temperature is lowered suddenly the number of pneumonias is correspondingly elevated; when from any cause it is necessary to turn the Seine water into the city pipes, the typhoid curve is elevated and remains so during the time of this exceptional distribution; when a small epidemic of variola develops, the number of vaccinations is multiplied, and soon the disease falls below the normal. Differences of detail, errors in diagnosis,—all causes of error fade away before the authoritative evidence of large numbers. The year just ended is particularly interesting and the weekly bulletins of the municipality furnish the necessary figures. The first thing that strikes one is the notable diminution in the general mortality. It is more than a tenth lower than the mean of the three preceding years. And what is still more remarkable this diminution is not found in the communicable diseases. Typhoid fever, variola and phthisis, on the contrary, present a rather marked elevation. The first two, in fact, assumed somewhat the nature of an epidemic at the beginning of the year. Diphtheria alone fell below the mean. The following table shows these differences more clearly:

Year.	Typhoid Fever.	Variola.	Diphtheria.	Tuberculosis.	Total Mortality.
1891 . .	476	39	1,361	11,895	52,558
1892 . .	799	42	1,557	12,153	57,137
1893 . .	649	302	1,465	12,267	52,955
1894 . .	758	183	1,149	12,288	49,079

The constant augmentation of the number of deaths due to disease is also worthy of note. It is in accord with the progressive increase of the population. The Minotaur exacts each year its proportional tribute of young lives without being influenced by anything.

Etiology of Cholera in Buda-Pesth in 1892-93.—Detvös, in a communication to the Royal Medical Society of Buda-Pesth, seeks to determine the hygiene of habitations and industrial occupations in the epidemic of cholera in 1892-93, (*Le Bulletin Medical*). He has been able to gather 19,000 observations It is shown that cholera raged most fiercely in the quarters of the city where non-filtered water was drunk. The new Francis Josef barracks, on the contrary, escaped the epidemic entirely. In a tile factory, where a large number of workmen were attacked it was found that they drank from a clay hole in which fecal discharges had been thrown. In another tile factory, where the disease was also prevalent, choleraic vibriones were found in the drinking water. The disease disappeared quickly when the use of canal water, artificially filtered, was prevented. Ten and six-tenths per cent. of the patients lived in unhygienic and over-crowded dwellings; 41.5 per cent. were day laborers; most of the others being coachmen or domestics out of employment; 8 per cent. belonged to the upper classes; 22.4 per cent. were alcoholics; 19.6 per cent. had been sick previously and 49.7 per cent. habitually used cold and dry food. M. Detrös was not able to trace any relation between the epidemic and the ground water, the temperature or the humidity of the soil, but abundant rains increased the morbidity. The water from canals artificially filtered was shown to be more infectious and richer in microbes than non-filtered water which was simply left to settle. Persons who drank directly from the Danube furnished a large number of cases.

MISCELLANY.

The College of Physicians and Surgeons of New York was damaged by fire January 27. Estimated loss is $10,000.

STUDENT.—Why does the Belladonna mean "beautiful lady?"

PROFESSOR.—Because it is paralyzant to the heart and a sympathetic stimulant, two characteristics of the "beautiful lady."—*The Corpuscle.*

Giantism a Disease.—Dr. Charles A. Dana, in the current number of *Scribner's*, discusses the function of the pituitary gland, and—following Marié's discovery, that hypertrophy of this body is frequently followed by abnormal growths—surmises that giantism is simply the result of such hypertrophy, is, in fact, a form of acromegaly. It is thence suggested that it would be interesting to learn the condition of this gland in the pygmies.

May Testify as to Neuritis Following an Injury.—In an action for personal injuries where it was alleged that the plaintiff's body was injured by dislocation, straining and laceration, and injuries of muscles, nerves and otherwise, and there was evidence which tended to show that the knee and hip were injured, and that the sciatic nerve became inflamed in consequence, the Supreme Court of Michigan held (Williams v. Cleveland, C., C. & St. L. Ry. Co., decided Dec. 7, 1894) that a physician might give evidence tending to show that, as a result of the injury, neuritis followed.

Should Go to the Jury.—When a competent physician acquainted with the facts, and judging from objective symptoms which are consistent with the opinion expressed, expresses an opinion that in his judgment an injury will be permanent, Judge Rumsey, of the Supreme Court of New York, holds, in the case of Brooks v. Rochester Ry. Co., decided October, 1894, the jury may, upon such testimony, find that the opinion is well founded. Certainly, he says, when such an opinion is expressed in that way, the question is for the jury, and not for the court.

Dangers of Chloroform Narcosis in Diabetic Patients.—Baixer calls attention (*Centralb. f. Chirurg.*) to the dangers of chloroform in diabetic patients, basing his remarks on three cases of his own and other cases in the literature. On recovering from the narcosis the patients may feel all right but in twenty-four to forty-eight hours they experience a sense of inquietude, then of hebetude, which passes into coma, in which state they very often succumb. Nothing characteristic is discovered at the necropsy. The author has been able to find acetone and acetic acid in the intestines, even in non-diabetic patients. As chloroform in diabetic patients—perhaps by some yet unknown change in metabolism—may give rise to dangerous secondary symptoms ending in coma and death, the author thinks the existence of diabetes is an absolute contra-indication to chloroform narcosis.

Salicylic Acid Externally in Articular Rheumatism.—Suspecting that the therapeutic action of salicylic acid in acute articular rheumatism was due to the anti-neuralgic action of the medicament on the rheumatic arthritis, and not to any specific action of its own, M. Maragliano requested MM. Jemma and Marengo to institute experiments on the curative influence of the drug applied locally in the form of an ointment. This mode of administering the acid was found to be preferable to giving it by the mouth; the derangements of digestion—even gastritis sometimes—so frequently observed when used internally do not follow its external application. From the author's researches (*Gaz. d. Osp.*) it is seen that salicylic acid has a decided and constant analgesic property; it acts on the diseased joints like a mild revulsant, not giving rise to any subjective symptoms. Its antipyretic action is very slight, but this is also true of it when given by the mouth.

Amputation of the Penis.—Pousson describes (*Ann. de Mal. Org. Gen. Ur.*), a method of amputating the penis which he asserts assures hemostasis during the operation, closes the corpora cavernosa hermetically and produces a sort of artificial hypospadias with a meatus of maximum size and constant permeability. It is a development of the methods of Esmarch, Phelip, Assaky and Guyon. Antiseptic methods having been employed a rubber bougie (No. 18 or 20) is introduced into the urethra which, serving as a support for the penis, facilitates the operation. This consists of three stages: 1, incision of the skin and ligation of the dorsal arteries—the skin is incised at the point where the corpora cavernosa are to be divided; the incision is raquette shaped, with the tail below; the dorsal arteries are then ligated; 2, the division of the corpora and of the corpus spongiosum and suture of the fibrous envelope—the corpora cavernosa are divided a little obliquely, following the skin incision; the corpus spongiosum is dissected up for a centimeter and a half above this and then cut; the fibrous envelope of the corpora is then closed with catgut; 3, establishment of hypospadias and suture of the urethral mucous membrane to the skin—a No. 18 or 20 sound is placed in the urethra and allowed to remain until about the fifth day when it is taken out and by about the tenth day reunion is complete. The author reports three cases, in all of which this method was successful.

Municipal Power where Smallpox is Epidemic.—To prevent injury to the health of the public generally, and to its individual inhabitants is, the Supreme Court of Appeals of West Virginia holds, in the case of Thomas v. Town of Mason, decided Nov. 24, 1894, one of the most important functions of a municipal corporation, and, when not expressly given, is conferred by implication upon all governing municipal boards, as a part of the police power of the State, delegated to them by the Legislature, so that reasonable by-laws in relation thereto have always been sustained as within the individual authority of such corporations to ordain. And the establishment of a State and local boards of health is not to be regarded as detracting from the general powers of municipal government unless such legislative intent clearly appears. The power to relieve the indigent sick in times of epidemic disease is inherent in every municipal corporation, upon the ground of self-protection, if upon no higher ground. Consequently when there is an epidemic of smallpox or other dangerous contagious disease within the corporate limits, the council of such city, town or village has power to provide for the medical treatment and care of poor persons residing therein. Moreover, this power, it is held, is expressly conferred in West Virginia by a statute which confers upon the town council, and imposes on it, the duty to take care to prevent injury or annoyance to the public or individuals from anything dangerous, offensive, or unwholesome, and stating that it shall have power to make and pass all needful orders, by-laws, ordinances, resolutions, rules, and regulations not contrary to the constitution and laws of the State. (Sections 28 and 43 of Chapter 47 of the Code.) It may, therefore, for example, employ a practicing physician of skill and experience to treat certain poor persons for smallpox, who are proper residents of the town. And having power to create a debt, it can, in a proper case, be compelled by mandamus to provide funds for its payment.

Discovery of the "Missing Link."—Dr. Eugene Dubois, a Dutch army surgeon at Batavia, announces the discovery of what he calls the *Pithecanthropus Erectus*— a supposed intermediate type between the apes and man. This discovery, according to *Le Progres Medical*, has aroused intense enthusiasm in the scientific circles of Europe and, if confirmed, will demolish the anti-Darwinists. M. Dubois found the remains in the lower quaternary of Sumatra. They consist of a well-preserved skull, a femur and a tooth; the two latter were found a few feet away from the skull. The cranium is intermediate between those of the anthropoid apes and of the native Australians. It has the characteristics of the celebrated Neanderthal skull exaggerated, with its enormous supra-orbital ridges. The cranium is 185 ctm. long, 130 broad, and has a capacity of about 900 to 1000 cubic centimeters—a capacity much larger than that of the gorilla, but inferior to that of primitive man. This capacity is found only among imbeciles in man. The tooth, which was the third upper molar on the right, was enormous and resembled one from an ape more than a human tooth. The position of the foramen magnum and the posterior aspect of the skull show it was more nearly perpendicular than in any anthropoid. The gibbon, of all the apes, walks the most easily, yet it is much more differentiated from man than is this skull. We may conclude then that this man-monkey was adapted for walking and a study of the femur confirms this. Dr. D. G. Brinton, in a letter to *Science* says: "One of the bearings of this discovery is upon the original birthplace of the human race. The author believes that the steps in the immediate genealogy of our species were these: *Prothylobates*, *Anthropopithecus Sivalensis*, *Pithecanthropus erectus* and *homo sapiens*. This series takes us to the Indian faunal province and to the other aspects of the great Himalayan chain, as the region somewhere in which our specific division of the great organic chain first came into being."

Advance in Medical Education.—Certificates of having worthily completed the preparatory medical course of the Nebraska State University will hereafter admit students—without entrance examination—to the first year classes in the Department of Medicine and Surgery of the Michigan State University and to the St. Louis Medical College; to the second year in the Northwestern University Medical School, to the University of Pennsylvania Medical Department, to the Omaha Medical College and to the John A Creighton Medical College; and to the third year of the Cincinnati College of Medicine and Surgery. The preparatory medical course of the University covers a term of three years and is open to students of either sex who have a fair mastery of English grammar, arithmetic, descriptive and physical geography and elementary history of the United States; students possessing higher qualifications are given credit therefore on entering and can thus shorten their term. The first year's work includes a thorough course in English, a course in Latin, algebra to quadratics, the first two books of geometry, logic and elementary courses in botany, chemistry and physics; in the second year structural and physiologic botany, the chemistry of the metallic elements and their compounds with five hours' laboratory work each week, rhetoric and theme-writing, lectures and laboratory work in physics, sound and heat, general osteology, hygiene and sanitation and physical training in the gymnasium; the third year covers pharmaceutic botany, a con-

tinuation of the study of the metallic elements and their reactions with laboratory work, comparative anatomy and human osteology, histology and embryology, psychology, including a study of the nervous system, sense-organs, psychophysical methods and results, instincts, consciousness, attention, association, habit, memory, emotions, will, dreams and hypnotism and a course in general physiology. It is not alone the mastery of these branches, as preparatory to the study of medicine, which should be found useful, but the training in habits of study itself—the acquisition of the tools of study and the skill to use them. The course is a distinct advance in the direction of the higher medical education.

Clothing and Equipment of the Sanitary Soldier.—Military surgeons who have an interest in the uniform and equipment of the Hospital Corps of the various European armies and who have endeavored to satisfy their interest by an investigation of the official regulations and handbooks, have usually heretofore met with disappointment. The uniform of medical officers could be ascertained with precision to the number of buttons and the width of lace, but little could be learned of the outfit of the sanitary soldier. The enlisted man of the Medical Staff Corps of the British service seemed to be primarily a soldier, to be clothed and equipped as such and to be armed with a rifle, notwithstanding the articles of the Geneva Convention. At all events he is drilled in the manual of arms and practices rifle shooting at Aldershot; but this is no doubt because much of England's warfare is conducted where the Red Cross of Geneva is unknown. Even the uniform and equipment of our own Hospital Corps does not appear to be very clearly defined. In the report of the Surgeon-General of the Army for the year ending June 30, 1892, are some plates which give us our best information on the subject. In these we find illustrated the full dress, fatigue dress and field accouterments. In the last the soldier is shown loaded with valise and blanket roll, canteen, haversack, a formidable knife and a large hospital corps pouch containing articles for field or emergency use. In the others he is represented as carrying only his knife and pouch. Pictures of the Hospital Corps soldier at work are given also in the Drill Regulations of the U. S. Army Hospital Corps. The reason why it is so difficult to learn about the clothing and equipment of these men is because in most of the services the Corps is in an evolutionary condition, and until this stage is completed we can not expect to find satisfying published accounts. In Surgeon-General Sternberg's last annual report it is stated that some minor points connected with the uniform and equipment of the Corps are under consideration, and that these will probably be settled during the course of the present year, "if the observation and experience of our medical officers suffice to determine the changes that are desirable and proper for permanent adoption with a view to promote efficiency in active service." We have learned that among the points concerned is the non-commissioned officer's sword, which is regarded by many as unnecessary as an indication of rank and as an incumbrance in the discharge of duty to the wounded. The knife of the private soldier is also condemned by some; it was originally intended to provide him with some kind of a weapon for Indian warfare without appearing to infringe on the terms of the Geneva Convention, but the Hospital Corps men are now authorized to carry revolvers in such wars. Even the full dress uniform is regarded by some as an unnecessary provision for the Corps, which should be considered as always on duty to attend to emergency cases occurring on reviews, parades and other full dress occasions.

Our British cousins, however, having had more experience than we, have reached that stage in which the whole of the subject of clothing and equipment can be gathered up from regulations and general orders and presented in the aggregate. We have just seen a copy of an English work, recently published and as yet rare in this country, in which this aggregation has been effected. It is a small octavo of 63 pages entitled, "A Manual of the Dress and Equipment of the Medical Services of the Army, Militia and Volunteers, Compiled by Surgeon-Captains Perry Marsh and S. O. Stuart, of the Army Medical Staff." In the first half of the pamphlet the outfits of the various grades of the Medical Department from the Director-General and Surgeons-Major-General, to the candidate on probation at the Army Medical School are carefully described, so that we have no difficulty in forming an idea of the appearance of an officer whether he is accoutered under the requirements of the review order for dress, the church parade order, the marching order, the field day order, the drill order or the mess order. With this, however, we are not interested at the present time.

The outfits of the men of the Medical Staff Corps in accordance with the various dress orders is given with so much detail that the prayer book, we learn from the church parade order, is carried in the left hand; but naturally our interest turns from this to the provisions for field service. The clothing is cut after the fashion of that of the rank and file of the Army, the tunic and frock of blue cloth or tweed, trimmed with scarlet worsted tubular braid around the collar, and with the Geneva cross on the right arm. The trousers have a quarter inch red stripe on the outer seam. The round forage cap, worn jauntily over the right parietal region, has a red button on top, red being the facing color of the Corps. The helmet, leggings and ankle boots are those of the infantry soldier. The Medical Staff soldier wears a waist belt of buff, which supports a valise, sword-bayonet and pouch; the last is of leather with a flap cover, something like our old style cartridge box, and is worn on the right side towards the front, supported on the waist belt by two loops through which the belt is passed. The scabbard of the side arm is on the left with a chape in front. The top of the valise behind is on a level with the axillæ; it is supported by two broad braces which pass over the shoulders and appear to be attached to the waist belt by the chape on the left and the pouch on the right. The haversack is slung across the right shoulder, the ends of the sling passing under the waist belt and supporting the sack over the upper part of the scabbard. The water bottle is slung across the left shoulder, its sling falling outside the waist belt and supporting the bottle behind the pouch. The great coat, folded, is placed under the flap of the valise; the cape is strapped to the bottom of the latter, and the mess tin on top between the shoulders. The valise on war service contains an emergency ration placed at the bottom (the current rations being in the haversack) a shirt rolled and placed next the ration, a woolen cap, a pair of socks and a hold-all containing a comb, knife, spoon and fork, and a pocket ledger when convenient. The towel and soap are packed on top of the great coat immediately under the flap. The weight of the war service equipment is not given, but that of the articles worn on marching order parades, home service, with the water bottle and haversack empty is stated to be thirty-two pounds, three and one-fourth ounces. Staff sergeants of the Corps have a sword instead of a sword bayonet. They carry the water bottle and haversack but have no valise; the overcoat when not in use is *en banderole* as in the case of commissioned officers. These sergeants have no pouch on the waist belt, but wear a cross belt from the left shoulder to the right armpit, carrying a special pouch which rests on the center of the back. This is said to contain writing materials.

The days of pipe clay have not yet departed from the British service, for among the points to be observed at inspection we find: "All articles of clothing to be thoroughly brushed and free from stains, the belts well pipe-clayed and presenting a smooth surface."

No statement is made of the purpose of the pouch worn by the privates, corporals and line sergeants of the Medical Staff Corps on the right of the waist belt. It is called an ammunition pouch, and is no doubt intended for cartridges, as the Corps is often armed with rifles as already stated; but nowhere is a specific statement made of its contents. The word, ammunition, is ambiguous. The boots worn by the Medical Staff Corps are called "ammunition boots," this being the English equivalent of what we would call "regulation boots" or those issued by the government. This pouch would make an excellent hold-all for emergency or first-aid packets, but the sanitary soldier in the British service does not seem to be provided with any such packets or other provision for aiding the wounded. It is only when there are wounded to be aided that these articles are intrusted to him. In the "Regulations for Medical Services, Part II, 1890," we find in the instructions for an advance to search for wounded, page 161, that the wagon corporals serve out the surgical haversacks and water bottles required by the bearer company for immediate use, and on page 73 the contents of a surgical haversack are stated, which is one bearer's dressing case, improved, containing several articles which should be used only by a surgeon. The men of the

bearer companies seem therefore to be merely bearers. In this country we endeavor to utilize the intelligence of every man, and even our bearers carry first-aid packets and know how to use them. In Massachusetts, we believe, the State troops have converted a cartridge box on the belt into a Hospital Corps pouch for emergency necessaries.

Hospital Notes.

THE NEW HOSPITAL system extending over all divisions of the Big Four railroad became operative February 1. The central hospital is in Indianapolis and branches are located at Cleveland, Cincinnati, Whitewater, Sandusky and Cairo. ——The Canton (S. D.) hospital has been organized with a capital of $5,000.——The Maternite Hospital which was recently established by the trustees and faculty of the Woman's Medical College of Baltimore, was formally opened January 24.——The annual report of the Rebekah Hospital of St. Louis shows that 309 patients were admitted during the past year.

Louisville Notes.

CITY HOSPITAL.—A second case of measles has developed following a sporadic case which occurred in the hospital a week or ten days ago. No serious spread of the trouble is anticipated. Pneumonia has been unusually fatal at this institution this year, only two recovering among the twenty or more admitted. Unusual involvement of the lungs in most cases being found, in one case especially both lungs being almost completely solidified.

MEDICAL COLLEGE SOCIETY.—A secret order christened the "Phi Chi" has sprung up among the students of the Louisville Medical College, the first lodge being called the Alpha Chapter. It is the intention eventually to include all medical colleges in the United States, the membership being limited to this class of students, the object being to "establish a fraternal feeling among medical students, during their college days, that may lead to beneficial results when these are passed."

LIQUOR LICENSE.—The report that the druggists had abandoned their fight against the law compelling them to pay a license to sell liquor, seems to have been premature. The new hope of the contestants is based on a clause which gives the court the right to intervene where the revenue from the sale of liquor is not equal to the license. March 4 is the time set for the hearing.

DEATH REPORT.—For the week ending February 8, there was a total of seventy-eight deaths. Among these were thirteen from pneumonia and consumption, seven from organic heart disease, and four each from old age, meningitis and typhoid fever.

BUTLER.—Dr. T. L. Butler, who is the lecturer on operative surgery in the University of Louisville was presented with a case of surgical instruments at the conclusion of the course Feb. 7, 1894.

St. Louis Notes.

ST. LOUIS MEDICAL SOCIETY.—At a recent meeting Drs. Hulbert, Blickhahn and Sluder were named by the President as a committee to investigate the merits of the serum therapy in tuberculosis, brought to the attention of the society three weeks ago by Dr. Paul Paquin. Their observations are to cover an extended period, that their reports may embody conclusions of value concerning the remedy. Meantime professional opinions are quite openly expressed. A few have taken the trouble to carefully examine the cases now under treatment by this method at the City Hospital, and they are impressed to assert that the matter deserves careful investigation; others, and they are more numerous, have, without evidence of any kind, condemned the new suggestion and its author. Their condemnation of Dr. Paquin is based on the reports current in the newspapers; their skepticism in the matter of the treatment would be commendable if it were not so gratuitous and unreasonable. It is asserted that Dr. Paquin is to be tried for a breach of ethics in his manner of presenting this matter.

The publication of the society proceedings has been given to the *Weekly Medical Review*, a St. Louis journal. Now and then there is a bright stretch in this desert of bitter controversy, personal and medico-political, that makes up these proceedings; but this journal has undertaken to contract to publish all, good, bad and indifferent. May there be enough of the first to redeem or excuse the rest.

THE CITY HOSPITALS.—Just now petitions and recommendations are pouring in on the mayor anent the appointment of heads of the City Hospital and the Female Hospital. A new Health Commissioner is also to be appointed. The administration of the present incumbent, Dr. George Homan, has been marked by conspicuous efficiency.

COMMITMENT OF INSANE TO ASYLUMS.—A bill has recently been introduced into the Missouri Legislature amending the law now governing the commitment of insane persons to the asylums of the State. As outlined in the dispatches, the change contemplated is an important one, but it seems but a careless and unconsidered effort to bring about a needed reform. Recognizing the laxity of existing law on this subject, this bill contemplates a reversal to an opposite and no more commendable extreme, in that it makes a jury trial necessary in every case where an insane person is to be deprived of liberty. The present law is better than that would be; all the change needed is more formality in the proceedings, raising the qualifications of physicians by requiring experience of three or more years before one can give a certificate of insanity, and the intervention of a court of record. The expense that will attend the operation of a law like that proposed will soon demonstrate the economical error it contains.

THE PUBLIC SERVICES.

Army Changes. Official list of changes in the stations and duties of officers serving in the Medical Department, U. S. Army, from Feb. 2, 1895, to Feb. 8, 1895.

Capt. REUBEN L. ROBERTSON, Asst. Surgeon, extension of leave of absence granted is further extended fourteen days.

First Lieut. JAMES M. KENNEDY, Asst. Surgeon, leave of absence granted on account of sickness is extended one month, on account of sickness.

Navy Changes. Changes in the Medical Corps of the U. S. Navy for the week ending Feb. 9, 1895.

Asst. Surgeon C. P. BAGG, detached from U. S. S. "Mohican," and ordered to the Naval Hospital, Mare Island, Cal.

Asst. Surgeon F. G. BRAITHWAITE, detached from Naval Hospital, New York, and ordered to examination preliminary to promotion.

Asst. Surgeon JAMES STOUGHTON, ordered to examination preliminary to promotion.

LETTERS RECEIVED.

Atkinson, W. B. Philadelphia, Pa.; Antikamnia Chemical Co., St. Louis, Mo.

Baker, Henry B., Lansing, Mich.; Brown, Warren, Tacoma, Washington; Bell, J. W., Minneapolis, Minn.; Bishop, S. S., Chicago, Ill.

Carheart, J. W., La Grange, Texas; Columbia Chemical Co., Washington, D. C.; Cook, G. F., Oxford, Ohio; Cushing, M., Joliet, Ill.

Dunlap, W. B., San Francisco, Cal.; Douglas, R., Nashville, Tenn.

Erwin, A. J., Mansfield, Ohio.

Getz, H. L., Marshalltown, Iowa; Gates, L. M., Scranton, Pa.; Gould, Geo. M., Philadelphia, Pa.

Humphrey, The H. B. Co., Boston, Mass.; Hanson, H. C., Sparta, Wis.; Hummel, A. L., Philadelphia, Pa.

Ingals, E. F., Chicago, Ill.

Lippincott, J. B. Co., Philadelphia, Pa.; Loeb, Hanau W., St. Louis, Mo.

Medical and Surgical Sanitarium, Battle Creek, Mich.; Murphy, M. D., Middleton, Conn.

Nowlin, A., Hulto, Texas.

Price, Mordecai, Philadelphia, Pa.; Perpoena Chemical Co., New York, N. Y.

Reed, R. Harvey, Columbus, Ohio; Roler, A. H., Chicago, Ill.; Robinson, Byron, Chicago, Ill.; Rudloff, H., Monks Corner, S. C.; Rust, C. A., Saginaw, Mich.

Sanders, Enno, (2) St. Louis, Mo.; Stearns, F. & Co., Detroit, Mich.; Smith, H. M., East Las Vegas, N. M.; Strong, Thos. D., Westfield, N. Y.; Sanderson, H. E., San Francisco, Cal.; Sudduth, W., Minneapolis, Minn.

Tuley, H. E., Louisville, Ky.; Thomas, F. S., Council Bluffs, Iowa; Tilton, H. R., St. Paul, Minn.

Veenschaten, T., Pella, Iowa; Vetter, J. C. & Co., New York, N. Y.

Wire, G. E., Chicago, Ill.; Williams, J. L., Boston, Mass.; Wyeth, John & Bro., Philadelphia, Pa.